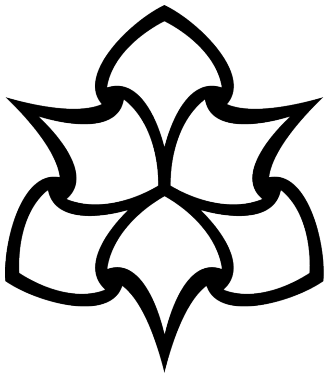

Value Creation in Smart Destinations.

The Case of Manchester

L Trinchini

PhD 2021

Value Creation in Smart Destinations.

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LINO TRINCHINI

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Se ti dico che la città cui tende il mio viaggio è discontinua nello spazio e nel tempo, ora più rada ora più densa, tu non devi credere che si debba smettere di cercarla.

Italo Calvino, “Le Citta Invisibili” (1972)

If I tell you that the city toward which my journey tends is discontinuous in space and time, now scattered, now more condensed, you must not believe the search for it can stop.

Italo Calvino, “Invisible Cities” (1972)

Abstract

Value co-creation is crucial to the conceptualisation of smart destinations. The integration of smartness in tourist destinations for the co-creation of value can drive innovation and enhance competitiveness. While smart tourism considers the prominent role of data and the advanced ICTs for value creation and innovation, S-D logic and strategic management respectively recognise knowledge and skills as determinant to the integration of resources for value creation and source of competitiveness. The evolving smart tourism destination definition is consistent with the service ecosystem concept. Considering the dynamic and complex nature of value co-creation in a smart ecosystem, an interdisciplinary approach involving the smart tourism, strategic management and S-D logic domains appears to be appropriate. The purpose of this research study is to explore and expand the theoretical and practical understanding of the value creation phenomenon in the smart Oxford Road Corridor of Manchester, from the rare and uncommon supply-side perspective.

In the light of the static and codified approach to knowledge and skills, this study adopts a social constructivist stance towards the investigation of inter-organisational knowledge, data sharing and smart ICTs use. In harmony with the interpretive-qualitative paradigm, the holistic single-case study guided the primary data (interviews) and online secondary data (documentary material) collection and analysis. The iterative coding process based on the thematic analysis of all data sustained the conceptualisation of the value creation process through the following major interrelated themes: v*alue creation enablers, value creation components, value creation constraints, addressing* (the) *constraints, innovation, contextual factors.*

The critical discussion about the themes helped with the definition of a holistic view of the phenomenon through an integrative framework resulting from the combination of a procedural and structural framework. In addition to the provision of the frameworks to advance understanding of the value creation process in a smart tourism ecosystem, this study has theoretical significance in enriching and expanding the body of knowledge in each and all the theoretical domains. Understanding this value creation process in detail and from a holistic perspective has several practical implications for local stakeholders, city managers and, particularly, data managers, on the ground of the emphasis ascribed to data skills.

Acknowledgements

This Ph.D. research would have not been possible without the support of the Manchester Metropolitan University and I cannot express enough gratitude to the Business School and the Graduate School.

I would also like to convey my sincere thanks to all supervisors Dr Thanasis Spyriadis, Dr Dario Tom Dieck and Dr Alice Graeupl for their continuous guidance, patience, motivation and support throughout the entire research journey. I take also the opportunity to thank my Director of Studies, Dr Thanasis Spyriadis, for giving me the opportunity to enrich my Ph.D. journey with seminars teaching and share invaluable knowledge about lecturing both undergraduate and postgraduate students. It was also a pleasure to share this experience with Ms Louise Penketh. As a novice assistant lecturer, I learned a lot from the both of you. I want also to thank the University of Central Lancashire and my current colleagues for the support during the time of my revisions and final submission of the thesis. A special thanks to the internal and external examiners for their time and advices during and after the Viva, until final submission.

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My sincere and profound gratitude goes to all interviewees who participated in this study and kindly offered their time, insights, and opinions. Without you, it would have not been possible to gain rich knowledge of the value co-creation process in Manchester as a smart destination. I hope they will find this useful and helpful.

This work is dedicated to all my teachers and professors, over the years, from the primary school to this Ph.D., which I was able to complete because of you all. I have been lucky to benefit from your guidance, backing, critique and inspiration that I hope to be able to transfer to other students in the same way.

I will never be grateful enough to my family in Rome for being understanding, motivating and supportive, as always. I hope to spend more time with them in the next future.

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Abbreviations

AI	Artificial Intelligence
AR	Augmented Reality
API	Application Programming Interface
CAQDAS	Computer Assisted Qualitative Data Analysis Software
CIO	Chief Information Officer
CMO	Chief Marketing Officer
CRM	Customer Relationship Management
DBE	Digital Business Ecosystem
DC	Dynamic Capabilities
DMO	Destination Management Organisation
G-D	Good-Dominant
GDPR	General Data Protection Regulation
GPS	Global Positioning System
ICTs	Information and Communication Technologies
IoT	Internet of Things
IS	Information Systems
IT	Information Technology
KBV	Knowledge-Based View
KIBS	Knowledge-Intensive Business Services
KM	Knowledge Management
MMU	Manchester Metropolitan University
MaaS	Mobility as a Service
PaaS	Platform-as-a-Service
RAM	Random-Access Memory
R&D	Research and Development
RFID	Radio Frequency Identification
RBV	Resource-Based View
SaaS	Software-as-a-Service
S-D	Service-Dominant
SL	Service Logic
SME	Small and Medium Enterprises
STE	Smart Tourism Ecosystem
TfGM	Transport for Greater Manchester
VR	Virtual Reality

Chapter 1. Introduction

This study addresses the process of value co-creation in smart destinations by focusing on the key role of inter-organisational knowledge applied to the exchange and integration of data, information, and technology resources. In this chapter, the context and nature of the study will be presented, along with the theoretical boundaries, research aim, scope, and objectives. In this specific domain, the research problem identifies the gaps and limitations that will be addressed by meeting the research objectives and responding to the research questions. The overall research strategy will be finally outlined alongside the structure of the study.

1.1 The context and nature of the study

Smart tourism and smart tourism destinations is the context in which this study analyses value co-creation from the perspective of its key determinants, with knowledge as one of the fundamental elements and source of competitive advantage. This research recognises knowledge and value co-creation as socially constructed phenomena to be examined by adopting an interpretivist view and a qualitative research approach.

1.1.1 Smart tourism and smart tourism destinations

Smart destination, smart experience and smart business are components of the emerging smart tourism phenomena (Gretzel *et al*, 2015a), which consider the impact of smart ICTs (e.g. Internet of Things) on the tourism industry, intensive data sharing and value creation. Thus, smart tourism takes in the crucial role that advanced ICTs play in creating the tourism experience, shaping the business context, and changing the ways in which destinations are managed and marketed. Tourist destinations are undergoing a major transformation due to the integration of smart ICTs into their infrastructure (Buhalis and Amaranggana, 2014). Tourists and residents can access and share any kind of information about a destination, interact with service providers in near-real time and actively co-create their experience. Similarly, private and public tourism organisations can provide better services by engaging both visitors and residents, collecting, exchanging, and processing almost any kind of data and information. Gretzel *et al* (2015b:3) describe this environment as an ecosystem taking 'advantage of smart technology in creating, managing and delivering intelligent touristic services/experiences and is characterised by intensive information sharing and value co-

creation'. Given that smart destinations include the smart experience and smart business ecosystem components, they can be viewed as a real and viable context through which examine smart destinations initiatives. As a special case of smart cities, smart destinations exemplify the evolution of tourist destinations towards a complex socio-technological ecosystem in which human and social capital, value co-creation and ICTs are the essential components (Boes *et al*, 2016). The combination and integration of the suggested hard smartness (advanced ICTs) and soft smartness (human capital, social capital, innovation, and value co-creation) into tourist destinations provides the basis for competitive advantage of smart tourism destinations (Boes *et al*, 2016). In this dynamic, complex, and integrated environment, all stakeholders collaborate and compete by interacting and exchanging services, information, skills, and knowledge to co-create value. Several smart tourism scholars (Buhalis and Amaranggana, 2015; Gretzel *et al*, 2015a; Neuhofer *et al*, 2015; Boes *et al*, 2016) have recognised the co-creation of value as crucial in tourists' technology-mediated experiences taking place within smart tourism service ecosystems to enhance smart destinations competitiveness. Despite the increasing reference to the S-D logic view of marketing and service management (Vargo and Lusch, 2017), there is still a limited number of tourism and smart tourism studies addressing the value co-creation and service innovation phenomena in destinations and from a supply-side perspective (Li and Petrick, 2008; Mohammadi *et al*, 2020). In line with the S-D logic definition of value co-creation through 'the application of competencies (knowledge and skills) for the benefit of another party' (Vargo and Lusch, 2008b:256), studying value co-creation in smart tourism destination service ecosystems requires attention to knowledge as essential to value creation, service innovation and 'fundamental source of competitive advantage' (Vargo and Lusch, 2008a:6; Polese *et al*, 2018).

1.1.2 Knowledge and value creation in tourism

Consistent with the S-D logic view, both knowledge and value co-creation are key to the working conceptualisation of smart tourism destinations (Cabiddu *et al*, 2013; Lusch and Vargo, 2014a; Gretzel *et al*, 2015a; Buhalis *et al*, 2020). S-D logic has been deemed as a service-centred marketing view marking a conceptual shift from conventional goods-based exchange to services-based exchange (Vargo and Lusch, 2004). According to this view, all market actors exchange services, rather than goods, by integrating their resources, with the common purpose of co-creating value. The process of value creation embodies the

distinction between the goods-based and service-centred view of markets. 'Firms propose value through market offerings and customers continue value-creation process through use value', rather than exchanging the value that is 'embedded' in goods and 'added by enhancing or increasing attributes' (Vargo *et al*, 2008:148). Therefore, value can only be established through resources integration and the interactions between all actors involved in the co-creation process (Prahalad and Ramaswamy, 2004; Lusch and Vargo, 2014a). Drawing on the intangible/operant resources (knowledge and skills) and tangible/operand resources (natural/man-made) distinction (Constantin and Lusch, 1994), S-D logic posits that 'all social and economic actors are resource integrators' in the relational, networked and interactive context of service ecosystems, with knowledge as a the key resource for firms' competitive advantage (Vargo and Lusch, 2008a:7; Akaka *et al*, 2012). Provided that all actors in the service ecosystem of smart destinations are resource integrators (Vargo and Lusch, 2008a; Maglio and Spohrer, 2008), it is no surprise that knowledge and skills have been recognised as the 'core source of all exchanges' aiming at value co-creation (Constantin and Lusch, 1994; Vargo *et al*, 2008:151). Being difficult to obtain, imitate or duplicate by competitors, knowledge has been identified as a strategic resource that helps the firm to differentiate and thereby achieve sustainable competitive advantage (Barney, 1991; Grant, 1996).

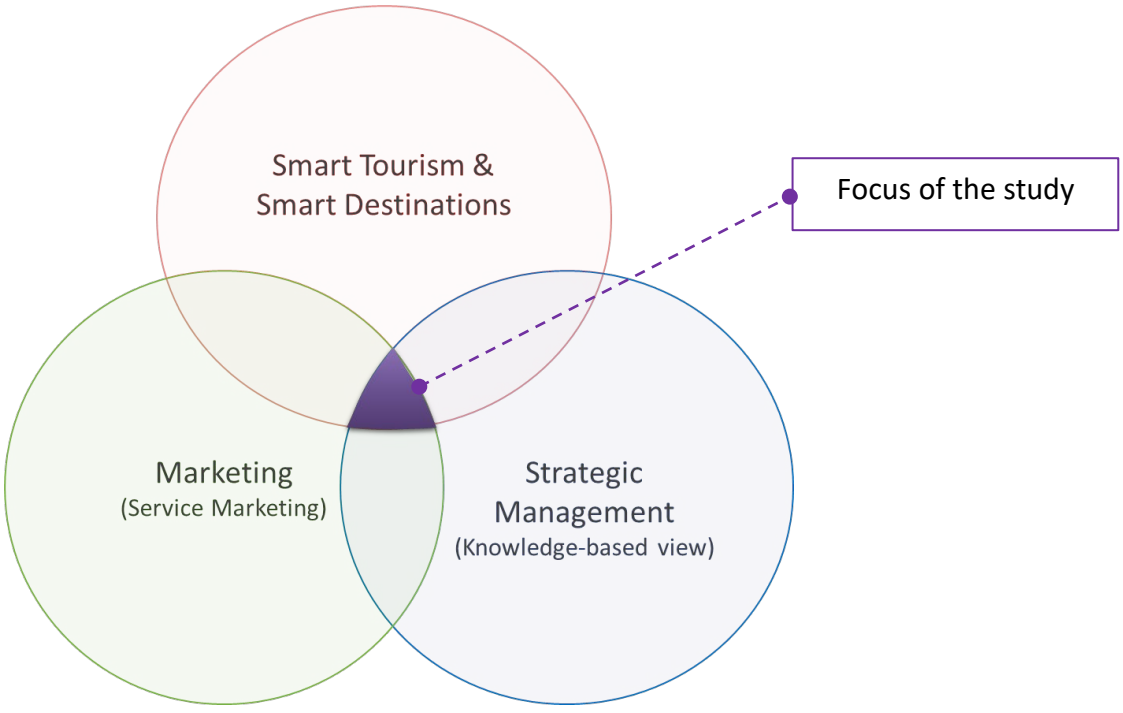
In strategic management, Resource-Based View (RBV) and Knowledge-Based View (KBV) perspectives see knowledge as key driver of value creation (Barney, 1991; Evans, 2016). While the latter sees knowledge as the major source of competitive advantage (Spender and Grant, 1996), the former consider knowledge as a generic resource and focuses on the integration of resources (Barney, 1995). S-D logic seems to be more consistent with RBV than KBV (Mele and Della Corte, 2013; Lusch and Vargo, 2014a). Since both RBV and KBV have been defined as internal resources and capabilities approaches to strategy (Grant, 1996; 2010), it could be assumed that S-D logic considers endogenous knowledge in the form of its integration in resources operand and operant) exchange processes, rather than the primary source of competitive advantage (Vargo and Lusch, 2017). In its hierarchy of resources, however, S-D logic considers knowledge as superordinate in comparison to all other resources to be integrated to co-create value (Vargo and Lusch, 2004; Madhavaram and Hunt, 2008). In terms of specialised competences and dynamic capabilities for value co-creation, the management of knowledge and skills are also recognised as strategic in S-

D logic and destination management (Lusch *et al*, 2007; 2010; Shaw *et al*, 2011; Raisi *et al*, 2020). Several scholars in tourism literature (Zehrer, 2011; Fuchs *et al*, 2013; Cooper, 2018) stress Knowledge Management (KM) approaches mainly based on Information Technology (IT) systems and the definition of knowledge as a "commodity", with plausible challenges and issues related to the recent S-D logic attention to value co-creation embedded in the social context (Edvardsson *et al*, 2011; 2012; Akaka *et al*, 2013; Vargo and Lusch, 2016).

1.2 Theoretical boundaries

The theoretical boundaries of this study are hereby showed in Figure 1, with the focus of the inquiry identified in the value creation processes emerging from the use of smart ICTs, data/information sharing, collective knowledge-based practices and interactions among actors of the Manchester as smart destination ecosystem. Value creation and value co-creation terms are used interchangeably in this study, given the assumption that value cannot be created without customers/consumers.

Figure 1. Theoretical boundaries and focus of the research.



1.3 Research problem

The co-creation of value is a key tenet of the paradigm shift in the general theory of service marketing and management proposed by the S-D logic. In comparison to the value-added approach of Good-Dominant (G-D) logic to service, the beneficiary of service exchanges

plays an active role in the creation of value proposed by the producer/provider (Vargo and Lusch, 2004; 2008b). Such a collaborative co-creation of value requires the application of knowledge and skills (Vargo and Lusch, 2004) as the most relevant resource for service innovation and competitiveness (Lusch *et al*, 2007; Lusch and Vargo, 2012b). Despite being undeniably influential and evolving over time, S-D logic embodies 'a mind-set and an organizing framework rather than a theory' (Vargo and Lusch, 2008b:257), and thereby difficult to be tested and applied (Evans, 2016). Yet, S-D logic has been recognised as a suitable approach for smart service ecosystems (Wang *et al*, 2013; Polese *et al*, 2018) of tourist destinations using value co-creation to enhance competitiveness (Boes *et al*, 2016; Troisi *et al*, 2019).

In smart tourism destinations, strongly characterised by pervasive and advanced ICTs as well as intensive data/information sharing (e.g. Gretzel *et al*, 2015b), the management of knowledge to support value co-creation has received limited attention (Mehraliyev *et al*, 2020). The smart tourism destination concept, however, can be placed at its early stage of development and still evolving without a clear or universally agreed definition (Del Chiappa and Baggio, 2015; Coca-Stefaniak, 2020). Furthermore, the increasing adoption of S-D logic in tourism (Vargo and Lusch, 2017) appears to be focused on more on the hospitality and customer's perspective domain (Shaw *et al*, 2011; Cabiddu *et al*, 2013; Fitzpatrick *et al*, 2013; Rihova *et al*, 2015), than tourist destinations (Warnaby, 2009; Wang *et al*, 2013). Understanding value creation in smart tourism destination from a supply-side perspective will reduce the current research conceptual gaps concerning the integration of knowledge and skills in the value creation processes within smart destinations.

All recent studies including value co-creation in tourism show particular attention to the use of advanced ICTs in supporting networked collaboration between all actors involved and knowledge transfer based on an effective data and information sharing (Buhalis and Foerste, 2015; Neuhofer, 2016; Ye *et al*, 2020). The stress on smart ICTs to co-create value and co-develop service innovation, with its dual role of operand/operant resource (Akaka and Vargo, 2014), can also be found in S-D logic (Lusch *et al*, 2010; Maglio and Spohrer, 2013; Lusch and Nambisan, 2015). At the same time, knowledge management approaches in tourism relying on the transfer of explicit knowledge after the conversion from tacit knowledge (e.g. Cooper, 2018) might present incongruences when applied to the value co-creation processes embedded in the social (Edvardsson *et al*, 2011) and cultural (Akaka et

al, 2013) contexts. Considering critical perspective on knowledge management based on the social construction of knowledge (e.g. Spender, 2008), the value creation process can be substantially affected by the different type of knowledge and knowledge management approaches adopted in smart tourism destinations.

From a social constructivist perspective (e.g. Giddens, 1984; Berger and Luckmann, 1991), knowledge and meanings are intersubjectively constructed by social actors within social context and systems. Value co-creation is intrinsically socially constructed and determined by the shared rules, values, norms, and meanings (i.e. institutions) of service ecosystems (Edvardsson *et al*, 2011; Vargo and Lusch, 2016; Polese *et al*, 2018). This view is consistent with the definition of service ecosystems based on the co-existence of service systems and social systems within which value co-creation and resource integration processes occur (Edvardsson and Tronvoll, 2011; 2018; Vargo and Akaka, 2012). Recent advances in smart destinations conceptualisation have recognised the soft smartness components alongside technology, such as human and social capital (Boes *et al*, 2016). Yet, the Smart Tourism Ecosystem (STE) concept still needs to be expanded beyond its technology-laden definition (Gretzel *et al*, 2015b; Ye *et al*, 2020).

The management of knowledge and value co-creation are also influenced by subjective determinants (Nonaka, 1994; Helkkula *et al*, 2012), like individuals' experiences, and the social constructivist approach provides only a partial view of such a complex and dynamic phenomenon. To date, however, few studies have paid attention to the social dimension of smart tourism (Gretzel, 2011; Hunter *et al*, 2015; Tribe and Mkono, 2017) or in relation to the S-D logic application to tourism and value creation (Rihova *et al*, 2015; Polese *et al*, 2018). Thus, there is a need of a richer and deeper understanding of how value can be created through the integration of collective knowledge and social interactions across stakeholders of smart tourism destinations and how this can be related to the current use of S-D logic in tourism literature. There is also a need to examine how uncertainty and asymmetries in smart tourism ecosystems can be faced through collective knowledge-based practices and interactions for value co-creation. Moreover, the role of value creation in enhancing smart destinations competitiveness through the application of socially based knowledge requires further investigations, particularly from the supply-side perspective, which is still relatively rare and uncommon in tourism literature (Galvagno and Dalli, 2014; Melis *et al*, 2015; Mohammadi *et al*, 2020).

1.4 Research aim, scope and objectives

This study aims to analyse the relationship between inter-organisational knowledge, data, technology, and value creation in smart destinations as a means for their competitiveness. The purpose is to explore and expand both current theoretical underpinnings and practical knowledge of value co-creation in smart tourism destinations. Since the objective of any activity, inquiry or procedure represents the output or what to accomplish by doing it, the following research objectives will help to achieve the aims of this study:

1. Explore extant literature to identify the preliminary propositions, concepts, themes and conceptual gaps to be addressed.

2. Examine smart ICTs use and data/information sharing across actors of the selected smart tourism destination to analyse their influence on the value creation process.

3. Examine collective inter-organisational knowledge-based practices to analyse how they influence the creation of value in the smart ecosystem of Manchester (Oxford Road Corridor)

4. Examine the role of institutions (e.g. shared rules, norms and beliefs) in influencing data, information, smart technology, and collective knowledge for value creation in the smart tourism destination.

5. To propose a conceptual framework for a better understanding of value creation processes and competitiveness of the smart tourism destination

1.5 Research questions

The focus of this study is on value creation processes that emerge from knowledge-based practices and interactions among economic, technological, and social actors of a selected smart destination service ecosystem. Hence, this study aims to answer to the following primary research question:

How can value be created in a smart tourism destination?

The following sub-questions were formulated to answer the primary research question and guide the empirical investigation.

1. *What kind of inter-organisational collective knowledge-based practices and social interactions support or restrain service exchanges and value creation?*

2. *How service innovation is co-produced and interpreted in the light of the collective knowledge-based practices and smart technologies for competitive advantage and value creation?*

3. *Why uncertainty and asymmetry linked to data/information and knowledge should be limited in the process of value creation in a smart tourism ecosystem?*

4. *How institutions (i.e. shared rules, norms, beliefs, and practices) influence value creation processes in smart tourism destinations?*

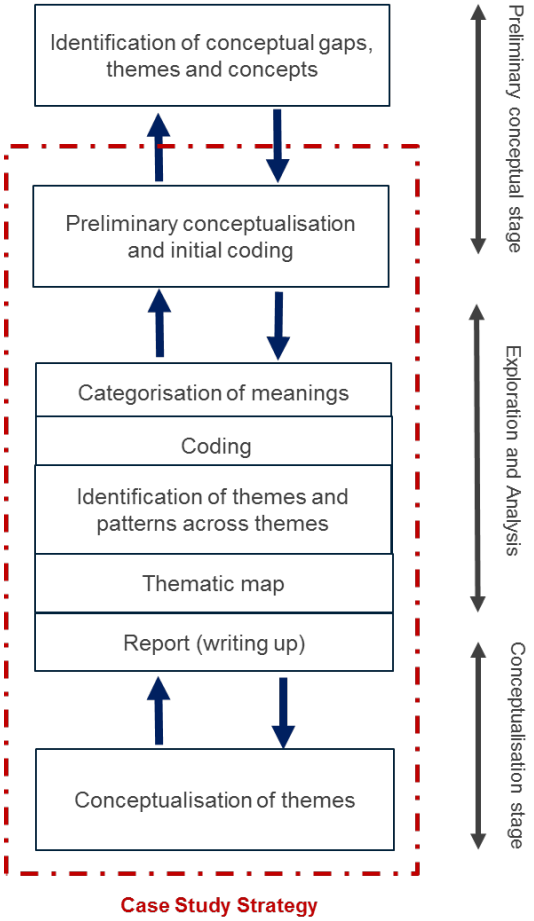
1.6 Research strategy

According to Gretzel *et al* (2015a:180), the smart tourism phenomenon is largely described 'in the form of case studies or isolated technological developments discussions, rather than laying the theoretical foundations for its advancement and/or critique'. On the other hand, Boes *et al* (2016:112) justify the multiple-case study approach to explore the smart tourism destination competitiveness on the ground of the 'contemporary character of the research topic' and 'the early, formative stage of the research'. This justification draws on Yin's (2014) definition of the case study as an in-depth empirical inquiry of a contemporary phenomenon in its real-life context and its pervasive adoption in tourism research and study (Beeton, 2005; Mehraliyev *et al*, 2020). This approach has also been recognised as a method to expand or generate theory (Eisenhardt 1989; Yin, 2014). Multiple cases studies provide a stronger base to build or expand theory in terms of cross-case analysis and data triangulation (Eisenhardt and Graebner, 2007), while the single-case study allow in-depth understanding of a phenomenon to also expand or generate theory (Siggelkow, 2007; Yin, 2014).

Thus, the high reliance on adjacent concepts and theories, such as value creation and S-D logic, to advance the smart destinations conceptualisation makes the single-case study a well-suited methodology to provide rich understanding of value co-creation in the complex and dynamic context of smart destinations. The single-case study adoption within tourism research tends to outnumber the multiple-cases study design (Xiao and Smith, 2006; Çakar and Aykol, 2020). Furthermore, the holistic-inductive nature of the case study approach and its flexibility in using multiple methods and data sources makes it appropriate to the study of tourism phenomena in view of its ability to better address complexity and subtlety than experimental methods (Beeton, 2005). By embracing the holistic single-case study approach, this study aims to explore the significance of inter-organisational knowledge,

among other resources, underpinning value co-creation in a smart destination ecosystem. The basic idea is to develop a process-oriented understanding of value creation as a social phenomenon framed by the context in order to empirically explore, analyse and explain the pervasive influence of collective inter-organisational knowledge and social interactions on service provisioning and value co-creation.

Figure 2. Outline of the research design



Given the subjective nature of value and the intersubjective nature of value creation, this study adopts an interpretive perspective that allows an inductive approach to the research problem. If reality depends on human actions and social or organisational context in which it is constructed (Walsham, 1993), then findings emerge during in-depth field examination and their interpretation is based upon an understanding of 'how practices and meanings are formed and informed by the language and tacit norms shared by humans working towards some shared goal' (Orlikowski and Baroudi, 1991:14). In short, social practices are embedded in the language used to describe them and the researcher is part of what is

being investigated. Hence, the adoption of thematic analysis to find patterns of meaning (i.e. themes) emerging from key informant interviews and secondary data.

Provided that smart ICTs are an essential component of the smart destination concept, a positivist approach to the research problem of this study might appear more appropriate than the interpretive perspective. Yet, several authors (Orlikowski and Baroudi, 1991; Klein and Myers, 1999; Walsham, 2001) have recognised that a realist position does not provide deep insights of the complex and dynamic interactions between people and IT. In addition, the interpretive approach provides an insider's perspective that is not possible to obtain from a neutral and detached view of a research problem. Therefore, this research strategy is consistent with the social constructivist stance of this study. The overall research design for this study is broadly presented in Figure 2.

1.7 Significance of the study

By expanding our understanding of value creation in smart tourism destinations, this study makes a theoretical and practical contribution to the field of service marketing, strategic management, and smart destinations in the following ways. Firstly, it contributes to a more in-depth understanding of inter-organisational knowledge-based value creation processes as strategic source of smart destinations competitiveness. Since knowledge and skills are recognised as determinant of value co-creation and competitive advantage (Madhavaram and Hunt, 2008), this study seeks to make a theoretical contribution to smart tourism and S-D logic by analysing in detail the implications for smart destinations from the supply side. Secondly, this research expands current knowledge and understanding of smart tourism destinations from both S-D logic and strategic management perspectives. In regard to the application of S-D logic and strategic management to smart destinations conceptualisation (Evans, 2016), the adoption of the social constructivist perspective on knowledge will help to expand the theoretical aspects thereof and support the practical contribution for smart destinations actors. Thirdly, this study has specific implications in providing valuable insights to all actors (e.g. destinations policymakers, tourism managers, public and private organisations) involved in managing knowledge-based resources and the integration of the other key resources for value creation in STEs. This practical contribution is embodied by a simplified and yet comprehensive conceptual framework illustrating the holistic view of the value creation process and its crucial factors.

1.8 Outline of the thesis structure

The argument of the thesis is supported by a structure consisting of eleven chapters. The context as well as the research problem, aim, objectives, significance of the study and the research strategy guiding the study are introduced in the first chapter.

The second, third and fourth chapter provides the theoretical and conceptual boundaries of the study by exploring and critically reviewing the literature respectively concerning the smart destinations conceptualisation, the value creation in this specific environment and the related strategic management perspective. The review of the current literature in each of these domains will inform the preliminary conceptual frameworks and propositions by delineating the perimeter of this study.

In Chapter 2, the extensive review of the smart destination conceptualisation involves the emergence of smart tourism as a multidimensional concept in the urban context (Section 2.1) and the definition of smart destinations as smart tourism ecosystems (Section 2.2). The smart destination concept is discussed as the combination of socio-technological and digital business ecosystems (Sections 2.2.1 and 2.2.2), with particular attention to the role of smart ICTs, data, information, and knowledge (Sections 2.3.1 and 2.3.2).

The value co-creation and strategic management concepts and theories are respectively addressed in Chapter 3 and 4. The different and evolving perspectives on value co-creation are presented in relation to service ecosystems and the recent conceptualisation of value-in-social-context (Section 3.2) in smart tourism service ecosystems (Section 3.3). From the strategic management viewpoint, the resource integration for value creation (Section 4.1) is explored and discussed to understand the role played by knowledge in the RBV and KBV perspectives. As determinant of value creation, knowledge and skills are also presented as the enablers of service innovation and eventually competitiveness (Sections 4.2 and 4.3)

Alongside the main conceptual assumptions (Section 4.4.1), the preliminary frameworks are introduced in Section 4.4. While the assumptions used in this study aim at clarifying the approach to relevant concepts and notions to better support the reader throughout the research, the critical review of the aforementioned theoretical domains informed the tentative structural and procedural frameworks. As informed by the literature review and the research questions, four tentative conceptual propositions are also presented in this chapter. The Oxford Road Corridor in Manchester is also defined as the selected research

context (Section 4.5) embodying the essential characteristics of smart tourism ecosystems (Section 4.5.1).

Chapter 5 discusses the philosophical position adopted by this research within the outlined methodological stance adopted (Section 5.2). This chapter argue in detail the salience and suitability of the single-case study as the chosen qualitative research strategy (Section 5.3). Along with the definition of the unit of analysis and sampling strategy (Sections 5.3.2 and 5.3.3), the data collection and analysis are delineated for both primary and secondary data (Section 5.3.4 and 5.4), including the detail of key informants selection (Section 5.3.4.2). The thematic analysis and coding process are defined in Section 5.4.3 for the primary and secondary data collected to identify the most significant patterns of meaning (themes).

By analysing the primary data collected from the interviews of key informants, Chapter 6 explores the value creation in the Oxford Road Corridor of Manchester, with reference to the most relevant themes generated (v*alue creation enablers*; v*alue creation components*; s*ervice orientation*; v*alue creation constraints*; a*ddressing* (the value creation) *constraints*; c*ontextual factors*). Each of the themes are analysed in detail by drawing on the different code levels and categories. Similarly, Chapter 7 is dedicated to the complementary analysis of secondary data, with the themes generated by applying the same analytical strategy of thematic analysis.

The discussion of the findings in Chapter 8 delineates the combination of the primary and secondary data analyses by relating back the findings to the research questions, literature, and conceptual propositions. The interpretation of the findings considers the significance of all enabling and restraining factors affecting the value creation process (Section 8.2), with reference to its key components (data, information, smart ICTs, and knowledge). The prominent role of collaborative competences (inter-organisational knowledge and skills) in driving service innovation and potential competitiveness is also discussed in connection to the practical use of smart ICTs (Section 8.3). The asymmetry and uncertainty influence on each and all components of the overall process is addressed in terms of constraints and the respective mitigating or neutralising factors (Section 8.4). After discussing the key role of contextual factors in influencing all of the value creation components (Section 8.5), the preliminary conceptual frameworks are revised and enhanced according to the discussed findings as well as their theoretical and practical interpretation (Section 8.6). This revision

and enhancement concerns both structural and procedural frameworks, which are finally integrated into an overarching conceptual framework.

Chapter 9 summarises this research study. The key findings are presented in response to the research aim, objectives, and questions (Section 9.2), along with the main theoretical and practical contributions to all theoretical underpinnings and practitioners (Section 9.3). Based upon the findings, limitations and the challenges encountered during the research process (Section 9.4), recommendations for potential areas of research are also suggested for service management, smart tourism, and strategic management domains (Section 9.5). Personal reflections and conclusive thoughts on the research journey are finally provided to illustrate this important learning experience.

Chapter 2. Smart destinations conceptualisation

The theoretical foundations of this research study are discussed by delving into the body of knowledge of smart tourism, service marketing (Chapter 3) and strategic management (Chapter 4). This chapter explores the literature pertaining the evolving conceptualisation of the smart tourism destinations as one of the key components of smart tourism. In doing so, the critical review of extant literature develops along three main interrelated lines: the smart tourism as a multidimensional phenomenon embedded into the urban context, the tourist destinations as smart ecosystems and the smart tourism ecosystem main elements.

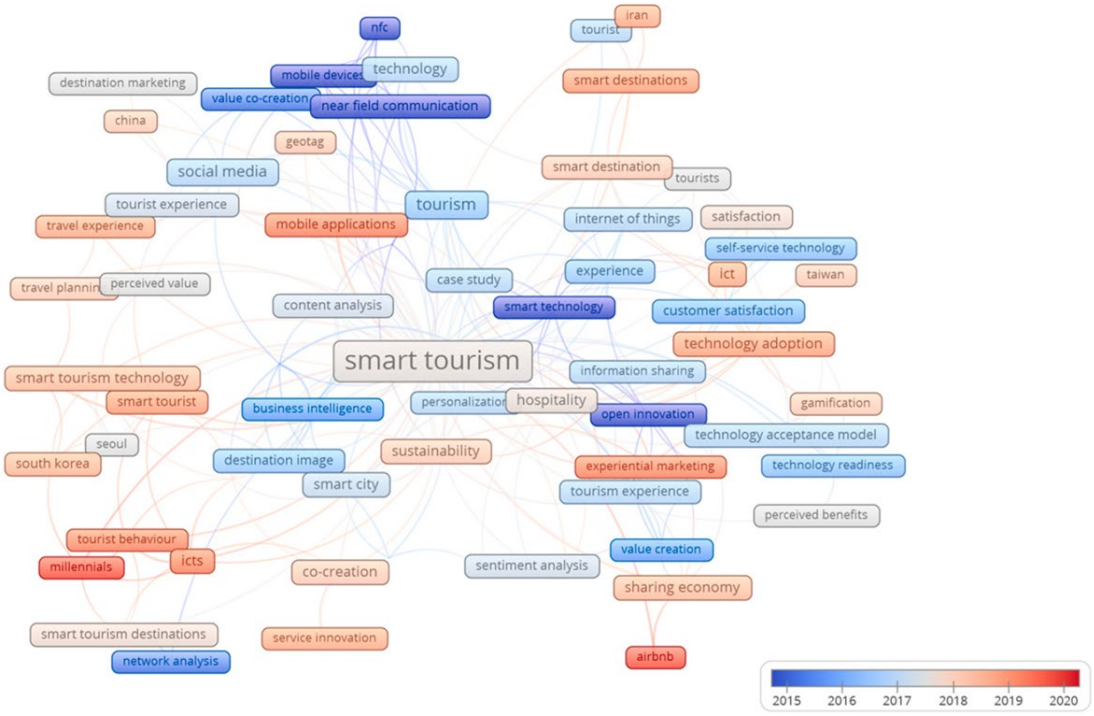
The ecosystem concept is key to this review. The application of smart tourism to the urban context emerged and expanded from the smart city concept (Gretzel *et al*, 2016), with an initial particular emphasis on big data and smart ICTs (Xiang *et al*, 2015). A less narrowed and more recent view of smart destinations is consistent with the complex, networked and adaptive nature of the socio-technological and digital business ecosystems (Polese *et al*, 2018; Mehraliyev *et al*, 2020). Such a complex and dynamic context can be understood by focusing on data, information, smart technology, and knowledge, which have been widely recognised as the essential components of smart tourism ecosystems (Del Vecchio *et al*, 2018).

2.1 The emergence of smart tourism

Smart tourism has increasingly gained the attention of practitioners and scholars, largely due to the development and widespread diffusion of smart ICTs (e.g. Internet of Things). According to Ye *et al* (2020), research in this specific field of tourism can be dated back to the mid-90s of the last century and regained attention by academics in 2012, with a peak of interest between 2015 and 2019. For the last five years period, this systematic review of the extant smart tourism literature reveals a particular emphasis on technology, along with tourist behaviour and experience (Figure 3). Undeniably, recent advancements in ICTs have played a significant role in enhancing tourist experiences as well as the management of destinations and tourism organisations (Buhalis and Law, 2008; Gretzel *et al*, 2015a). Web search engines, social media, smartphones, and other smart ICTs, like AI and sensors, have increasingly supported the tourist decision-making process and direct engagement with suppliers (Jacobsen and Munar, 2012; Wang *et al*, 2014). In turn, these ICTs empower

tourist destinations and suppliers in gaining competitive advantage through differentiation and cost reduction (Buhalis and Amaranggana, 2014; Porter and Heppelmann 2014).

Figure 3. Smart tourism literature themes 2015-2020



(Ye *et al.*, 2020:5)

The rapid evolution of cloud computing, smartphones, and sensors has had a great impact on the tourism industry on the ground of their interconnection and integration into the destinations physical infrastructures to support better on-site travel experiences. As such, the growing interest in smart tourism can be easily associated with the technological trend influencing real-time tourists' experience and destination management. Nonetheless, the extant conceptualisations tend to consider the multidimensional nature of smart tourism, rather than the sole, though important, aspect of advanced technology. In their seminal paper, for instance, Gretzel *et al* (2015) consider smart destinations, smart experience, and smart business ecosystem as the underpinning components of smart tourism supported by ICTs. Although each of them is important to understand this new phenomenon, smart destinations can actually incorporate the smart experience of tourists and the evolving business ecosystem (Buhalis and Amaranggana, 2015) and they tend to serve as a testbed for smart tourism initiative before their implementation at a larger scale (Gretzel *et al*, 2016).

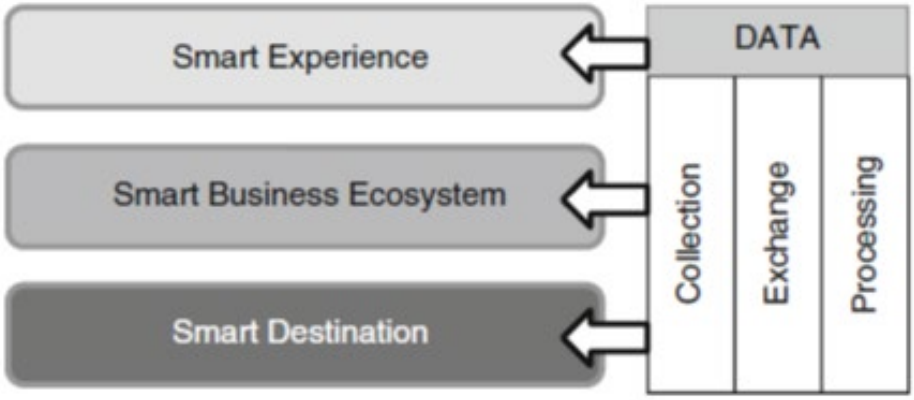
2.1.1 Smart tourism: a multidimensional concept

The hardware, software, NetWare and Humanware integration for the benefit of tourism organisations, destinations, and consumers (both tourists and residents) clearly marks the distinction between the e-tourism and smart tourism conceptualisations (Buhalis 2003; Gretzel *et al*, 2015a). Rather than isolated technical solutions or platforms, smart ICTs are expected to sustain enhanced tourist experiences as well as destination marketing and management through their coordinated implementation (Kitchin, 2014a; Del Chiappa and Baggio, 2015). The integrated and advanced ICTs infrastructure will gradually permeate and transform business functions and processes. However, smart tourism cannot only be defined by technological developments. While acknowledging the essential role of smart technology, Gretzel *et al* (2015a) have also recognised institutional and structural market changes as foundational building blocks of smart tourism. Smart technologies are bridging the digital-physical gap in urban ecosystems (Cassandras, 2016). In turn, the intensive data sharing enable open innovation environments and the definition of new business models by tourism organisations changing their way of capturing, creating, and delivering value to both customers and residents (Schaffers *et al*, 2011; Kitchin, 2014b).

Given the importance of open innovation in smart destinations (Del Vecchio *et al*, 2018), organisations cannot afford to rely entirely on internal innovation strategies to enhance their services (Chesborough, 2011; Egger *et al*, 2016). Thus, the exchange and integration of external resources (e.g. ideas, technology and data) into firms' processes and functions is essential to develop and manage new business models (Hippel and Krogh, 2003; Miles *et al*, 2006; West and Bogers, 2014). To create and capture value, Chesbrough (2007; 2013) advocates the implementation of open business models through collaborative approaches to customers, markets, and services development. With data, information and technology being increasingly available and accessible to people and tourism organisations (Hjalager, 2010), business model innovation may prompt new markets and services developments at destination level (Mitchell and Coles, 2003; Zott *et al*, 2011; Souto, 2015). Effective smart tourism business models have not been established, yet, because of the lack of suitable theoretical underpinnings (Gretzel *et al*, 2015a). In the literature, however, the notion of value and ecosystem have been commonly deemed as crucial to smart tourism, business models and open innovation. Zott *et al* (2011) identify the prominent role of value creation as enabler of business models conceptualisations in networked markets, while Weiblen

(2014:50-51) recognises the importance of value co-creation in open innovation contexts and the role of open business models 'as an ecosystem-aware way of value creation and capturing'. Hsu *et al* (2016) point out that operating within a smart tourism ecosystem requires innovative user-oriented business models centred on the integration of external resources and value co-creation. Gretzel *et al* (2015b:560) refer to the digital ecosystems and smart business networks concepts to define the smart tourism ecosystem in terms of the 'advantage taken by a tourism system in using smart technology to create, manage and deliver intelligent touristic services/experiences at a place'. The active role of tourists in co-creating their experience is a direct determinant of any smart tourism experience. The ubiquitous access to real-time data and information through smart ICTs allow tourists to interact with service providers and enrich their experience (Neuhofer *et al*, 2015). For example, by using their smartphones to find directions or upload photos on social media, smart tourists share data and information that tourism organisations can transform into personalised services as part of their value proposition (Buhalis and Amaranggana, 2014; 2015 Wang *et al*, 2014).

Figure 4. Components and layers of smart tourism



(Gretzel *et al*, 2015a:181)

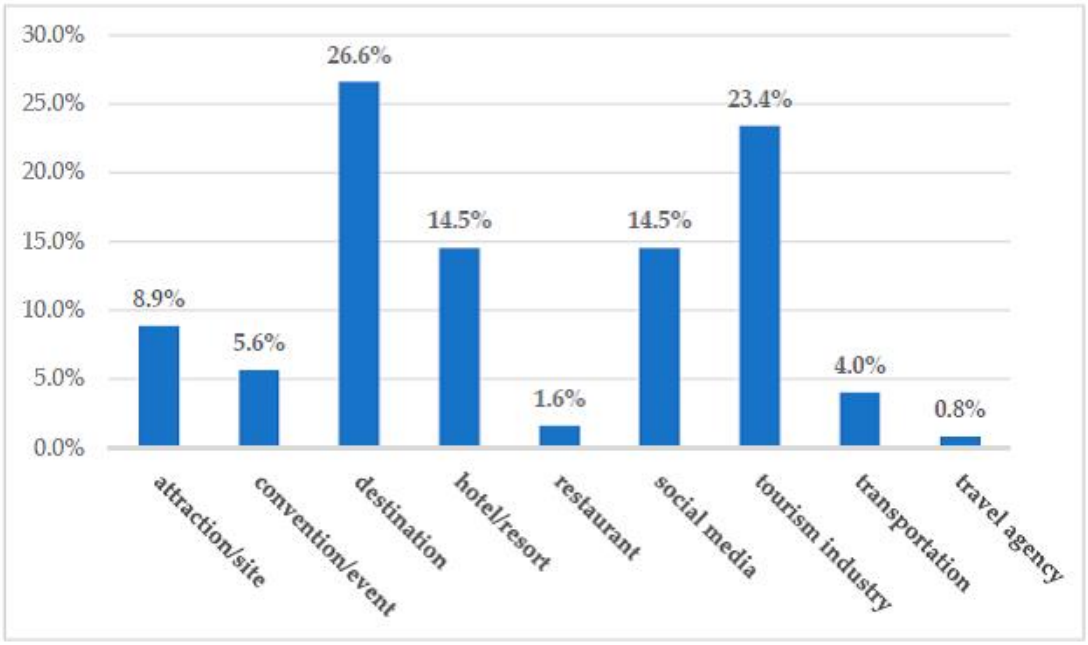
Therefore, the smart business ecosystem supports the exchange of data and information for the co-creation of the smart tourist experiences at the destination. Schaffers *et al* (2011) and Anttiroiko *et al* (2014) observe that smart service ecosystems are characterised by cooperative and active forms of engagement between firms, tourists, residents, and local governments facilitating open innovation and urban governance. To define the business environment of smart destinations, Buhalis and Amaranggana (2014) refer to the

collaboration of public and private stakeholders and the digitisation of core business processes. Smart tourism has been defined as a multidimensional concept entailing three distinct and related dimensions: smart experience, smart business ecosystem and smart destinations (Figure 4). This view of smart tourism destinations aligns with the smart city conceptualisation and smart urban initiatives (Cocchia, 2014). As observed by Gretzel *et al* (2016:online), applying smart tourism to cities 'makes a lot of sense, given the high needs for infrastructure and high concentration of other resources and users necessary'.

2.1.2 Smart tourism and the urban context

The current global economic trend and socio-technological developments are driving the interest towards smart urban tourism. As shown in Figure 5, this aligns with the proportion of smart tourism destinations studies in the literature. Even if the world urban population estimates vary, there is consensus among governments and international institutions that the proportion of people living in towns and cities is constantly increasing. According to the United Nations (2018), urban areas are projected to house 60% of people globally by 2030 and one-third of the people will live in cities with at least a million inhabitants. This is particularly evident in the growth of cities with more than 10 million people (Megacities) and located in lower-middle-income countries of Asia and Africa (United Nations, 2018).

Figure 5. Smart tourism literature distribution



(Ye *et al*, 2020:7)

At the same time, urban areas will make a significant contribution to national economies. For instance, the world's 750 largest cities represent 57% of global Gross Domestic Product (GDP) and will contribute 61% to the world economy by the year 2030 (Oxford Economics, 2015). Given the contribution of large cities to the economy (Cadena *et al*, 2012), such a profound change will have significant implications for tourism as a crucial component of local and national economies (Law, 2002; Ashworth and Page, 2011). Urbanisation and the growth of city tourism have been usually associated with globalisation for several reasons. First, socio-cultural attractions, events, and new market opportunities in cities across the world have increasingly fostered global investments, international tourist flows and urban tourism (Spirou, 2011). Second, the diffusion of low-cost flights has made city destinations trips more affordable to a larger number of potential tourists than before (Graham, 2008; Dunne *et al*, 2010). Third, the changes in tourists' behaviour and internal socio-economic structure of cities has reduced the distinction between the production and consumption of tourism products at the destination (Page and Hall, 2003; Pappalepore *et al*, 2014).

The search for personal and authentic experiences in association with city attractions and services that are not mainly designed for tourists have favoured the interaction between city residents and tourists (Ashworth, 2003), who willingly consume and experience the same places, events and amenities of locals (Giovanardi *et al*, 2014). Hence, a vision of the city as an attractive destination, rather than a gateway for travellers (Short *et al*, 2000; Dunne *et al*, 2010). Small and medium cities also face challenges imposed by the global economic forces, with a greater impact on their tourism economies than the so-called "world cities" (Del Corpo *et al*, 2008; Maitland and Newman, 2014). As noted by Ashworth and Page (2011:4), world cities 'are important hub to generate tourism, but their main economic rationale is not tourism', which is reflected in the relative disconnection of these cities from their local and national tourism economies (e.g. London). This poses challenges concerning competitiveness and the use of tourism as a driver of local socio-economic development. With differences between local and regional economies across the world, the concentration of tourism activities, the "repackaging" of the creative industry into specific attractions (e.g. fashion, art and sport) and the business related travelling to conference venues are transforming world tourism cities (Maitland and Newman, 2014). To stay competitive, large cities like New York, London, Tokyo, and Berlin use their tourism assets, multiculturalism, and international status. Besides, polycentricism of these global

cities has changed the functional structure of respective city regions and the relationship with minor cities (Hall and Pain, 2006), with larger impact on “space of flows” than “space of places” (Castells, 1989; 1996). This is essentially due to the global socio-technological forces that have transformed cities into “hub” and “nodes” within the networked flows of goods, services, information, and people (Castells, 2004; 2011). The combined use of the Internet and mobile web technologies by tourists and residents has facilitated mobility and global connectivity between cities (Hall and Pain, 2006; Sheller and Urry, 2006), which can also be recognised as hybrid spaces where the digital, physical and social spaces overlap (De Souza e Silva, 2006; Cassandras, 2016). This trend has been further boosted by smart ICTs. Urbanisation is experiencing the integration of advanced ICTs into infrastructure and business environment. According to Cisco (2020), the number of devices connected to the Internet will be more than three times the world population by 2023, while more than 60% of the global population will have access Internet access.

Regardless of their population and tourist vocation, cities competing in the global tourism market embrace these technological advances and big data analysis to provide tourists and residents with enhanced technology-mediated experiences, while improving governance and sustainable development (Buhalis and Amaranggana, 2014). The smart city concept is strongly rooted in the smart ICTs integration into the urban context, even if technologies are only a part of it. Alongside technology, Nam and Pardo (2011) recognise the human (e.g. social capital) and institutional (e.g. governance) factors as key components of Smart Cities. Similarly, Bock (2015) stresses the integration of tourism into urban development by discussing smart tourism in terms of the socio-technological acceleration of life that is changing the nature of city tourism and behaviour of tourists. In particular, she refers to personalised technology-mediated experiences reducing the tourist-resident boundaries and pervasive connectedness as major implications for future cities development. Still, the concentration of people and resources within the urban context as much as the business environment density of smart tourism ecosystems should also be considered in relation to the public-private collaboration and coordination facilitated by smart ICTs (Gretzel *et al*, 2016). Therefore, the disruptive changes enforced by the smart tourism implementation in cities concerns all stakeholders involved (i.e. tourists, residents, and organisations) and their networked relationships. As extended conception of smart cities and fundamental component of smart tourism (Lamsfus *et al*, 2015; Jovicic, 2019), smart destinations have

been increasingly discussed, analysed and conceptualised as complex networked socio-economic and digital ecosystems (Gretzel *et al*, 2015b; Polese *et al*, 2018; Raisi *et al*, 2020).

2.2 Destinations as smart ecosystems

Smart destinations literature draws on the smart tourism and smart city concepts. There are several definitions of smart city depending on the meaning of "smart" and "smartness" terms (Cocchia, 2014), and the same lack of definitional clarity may apply to smart tourism (Gretzel et al, 2015a). Although the role of innovation and ICTs is commonly acknowledged in the different interpretations of smart cities (Schaffers *et al*, 2011; Dameri, 2014; Caragliu and Del Bo, 2019), technical developments have also been associated with the political, economic and socio-cultural factors to provide an overarching view of smart city (Hollands, 2008; Anthopoulos *et al*, 2016). While some scholars (Bakici *et al*, 2013; Piro *et al*, 2014; Höjer and Wangel, 2015) advocate the key role of technology in enhancing local services and improving overall quality of life, others (Nam and Pardo, 2011; Thite, 2011; Albino *et al*, 2015) stress the smart city ability to attract knowledgeable people, nurture the creative economy and promote socio-economic developments through an open and collaborative environment. In recent smart cities initiatives across Europe (Bakici *et al*, 2013; Boes *et al*, 2016), the combination of socio-technological and economic components has been proven successful in fostering innovation, better governance, and the collective management of resources (Mancebo, 2020). However, the smart city theoretical foundations seem still to be grounded in the collection of independent initiatives using innovative technologies to improve the quality of urban life (Cocchia, 2014). Alongside social inclusion and well-being, the quality of life appears to be a major tenet in academic definitions of smart city, rather than embraced by firms and institutions (De Santis *et al*, 2014). Even if the conceptual and operational definitions of smart city tend to diverge, there is convergence towards a broad definition and application of the "smart" term beyond its digital notion. As an extension of smart cities, smart tourism destinations conceptualisation has been experiencing a similar path and the same challenges. In addition to the prominent focus on the implementation of smart ICTs into tourist destinations (Lamsfus and Alzua-Sorzabal, 2013; Guo *et al*, 2014; Ivars-Baidal *et al*, 2019), the recent efforts at agreeing an all-encompassing definition of smart tourism destinations tend to include socio-economic dimensions (Boes et al, 2016; Del Vecchio *et al*, 2018). In agreement with the smart city principles (Caragliu *et al*, 2011), several authors advocate human and social capital investments, collective competitiveness

and open innovation as essential to improve the smart destinations socio-economic and environmental prosperity (Polese *et al*, 2018; Jovicic, 2019; Williams *et al*, 2020). Even if 'the [smart destination] concept itself may be considered still in progress' (Del Chiappa and Baggio, 2015:146), it is possible to recognise some common and relevant tenets across the current conceptual developments, such as: service ecosystem, open innovation, value co-creation, data and information sharing, knowledge management and smartness. So, smart destinations conceptualisation requires an interdisciplinary approach, with the integration of knowledge from the interrelated domains of Information Systems, service marketing, strategy, data and network analysis (Wang *et al*, 2013; Xiang and Fesenmaier, 2017; Raisi *et al*, 2020). Smart destinations have been considered as the digital and physical context for the interconnection of stakeholders engaging in smart experiences and value creation processes. As such, the idea of smart destinations as smart tourism ecosystems provides an insightful overview of the complex relationship between actors and resources. To better understand the structural characteristics of smart tourism ecosystems, it has been deemed as crucial to consider the social and technological systems in combination with the DBE, as contended by the majority of smart tourism scholars (Gretzel *et al*, 2015b; Boes *et al*, 2016; Polese *et al*, 2018).

2.2.1 The socio-technological ecosystem

Tourist destinations are recognised as complex systems of interrelated stakeholders and industries adding value to the tourist products and services combination for the benefit of visitors, residents, and destinations alike (Peltoniemi and Vuori, 2004; Sainaghi and Baggio, 2017). Several networked factors complicate the management of tourist destinations and their competitiveness. Different small and medium suppliers collaborate and compete at the same time to combine and sell services to visitors (Beritelli, 2011; Della Corte and Aria, 2016), because it is commonly harder for them to reduce costs and increase revenues on their own. Given that the extensive and diverse availability of services at the destination has a utility value for each tourist, the final price will be higher because each service can be individually purchased and consumed (Keller, 2004). Tourist destinations are difficult to be managed, marketed, and governed by local or regional institutions, because of their heterogeneous and fragmented structures. Hence, the stress on the potential contribution of smart technologies in facilitating dynamic coordination of all stakeholders to enhance destination governance and management, while enabling demand and supply to co-create

value and enhance tourist experiences through data and information sharing. As contended by Gretzel *et al* (2015b:560), smart tourism destinations 'can be defined as a tourism system that takes advantage of smart technology to create, manage and deliver intelligent touristic services/experiences and is characterized by intensive information sharing and value co-creation'. With smart technologies and big data, therefore, tourist destinations strive to enhance their services and provide better experiences to tourists to improve their competitiveness (Crouch and Ritchie, 1999; Koo *et al*, 2016).

To date, the literature focusing on the role of smart ICTs in tourist destinations has mainly addressed business intelligence solutions and context-based technologies to understand tourist behaviour and experiences. From the supply-side perspective, Fuchs *et al* (2014), for instance, propose the use of data management for information system to support destinations decision-making based on the tourists' real-time data collection and analysis. Tussyadiah and Zach (2012) also explain the impact of geo-based technologies on people experiencing places. Feng *et al* (2014) argue upon structured data, platforms and services underpinning smart tourism service mechanisms based on context awareness. Several authors have also referred to the contextual intelligent systems and services, like AI, 'as a starting point for the theory of smart destinations' (Staab *et al*, 2002; Gretzel, 2011; Lamsfus *et al*, 2015:364). Considering that cities are experiencing the transition from being "intelligent" into becoming "smart" (Deakin and Al Waer, 2012), the smartness of tourist destinations can be deemed as a crucial concept that is rooted in ICTs, and not limited by them. "Intelligent" and "smart" are conceptually different, even if the terms seem to be equivalent and interchangeable. As clarified by Li *et al* (2017:294), 'intelligence lays in the basic utility of knowledge and information, but smartness is a sublimation of intelligent power anticipating needs.' In smart destinations, the process of providing travel directions by means of a software-based recommendation system resulting from tourists' inputs at the destination could be defined as intelligence.

Conversely, smartness can be recognised in the process of coordinating stakeholders and providing services that is based on the capability of the destination to leverage on previous experiences, knowledge, data, and information management. An agreed, extensive, and clear description of urban smartness within tourist destinations is, however, at its early stage of development. At first, Buhalis (2015:online) provided a definition of smartness as 'interconnectivity and interoperability of integrated technologies to reengineer processes

and data in order to produce innovative services, products and procedures towards maximising value for all stakeholders'. With smart technology shaping products, services and actions in real time through the integration of all stakeholders within the value system, smartness represents the 'glue of interconnected and mutually beneficial systems and stakeholders and provides the info structure for the value creation for all' (Buhalis, 2015:online). In line with the notion of smart city considering smart technology and social components synergy (Caragliu *et al*, 2011; Schaffers *et al*, 2011; Meijer and Bolívar, 2015), Boes *et al* (2016) have furthered this view by distinguishing "hard smartness" (i.e. Smart ICTs) from "soft smartness" (i.e. social capital, human capital, leadership and innovation), within the value system of smart destinations. To enhance competitiveness through value co-creation, they suggest that smart destinations 'have to integrate the entire range of smartness components and ensure interoperability and interconnectivity of both soft and hard smartness' (Boes *et al*, 2016:120). Drawing on this view, Buonincontri and Micera (2016:291) explored the co-creation of experiences in smart destinations by analysing 'the interaction among firms and tourists, the active participation of tourists, and their need of sharing the experience with other subjects'.

Tourist destinations can benefit from knowledgeable workforce and creativity to support human capital development (Yigitcanlar *et al*, 2008; Richards, 2014), big data, open data and information sharing to foster open innovation (Kitchin, 2014a; Sigala *et al*, 2019) and collaboration between all actors to build social capital (McGehee *et al*, 2010; Dickinson *et al*, 2017). Even if each of these "soft smartness" enablers has been addressed and criticised within and beyond the tourism domain (Boyd and Crawford, 2012; Inaba, 2013; Moscardo *et al*, 2017), their combination and integration with smart ICTs could prompt smartness in tourist destination through strategic management and leadership (Nam and Pardo, 2011; Boes *et al*, 2016; Gretzel, 2018). In the European "Horizon 2020" programme, for example, several Living Labs projects have been carried out in Amsterdam, Antwerp, Barcelona and Helsinki to support open innovation, citizens participation, public-private partnerships and the co-creation of services through smart ICTs (Schaffers *et al*, 2011; Bakici *et al*, 2013; Komninos *et al*, 2019). With different approaches to Living Labs, these cities have stressed the collective knowledge, learning programs for residents, open data and collaborative spaces facilitating value co-creation and thereby competitiveness (Bifulco *et al*, 2017). The recent "European Capital of Smart Tourism" award initiative have similarly considered the

technology, sustainability, accessibility, digitalization, cultural heritage, and creativity themes (European Commission, 2018). Therefore, the notion of smart destination requires an understanding of the people, society, and technology interactions. As contended by several scholars (Winner, 1986; Green, 2002; Feenberg, 2012), technological determinism does not offer an adequate approach to technological and societal developments. The idea that technology shapes society has been essentially questioned in terms of their mutual influence (Feenberg, 2012) and the relevant role of social groups (producers and users) in negotiating and accepting technological artefacts (Pinch and Bijker, 1984; Williams and Edge, 1996). This socially constructed view of technology ignores the consequences of ICTs and the role of non-relevant actors, not involved in the process, and yet affected (Russell, 1986; Winner, 1993; Wyatt, 2008; Feenberg, 2012).

Within service ecosystems, social and economic actors exchange and integrate resources through institutions and ICTs to co-create value (Vargo and Lusch, 2016). Smart business networks, and broadly all tourist destinations stakeholders, rely on the web, social media and any other smart technology enabling them to connect to one another, collaborate, exchange resources and co-create value (Vervest *et al*, 2005; Barile *et al*, 2017). The match between the service ecosystem and interconnected, heterogeneous networks of tourist destination actors characterises the smart tourism ecosystem (Gretzel *et al*, 2015b; Boes *et al*, 2016). In this complex environment, all actors involved in the co-creation of value are resources integrators and their predefined roles are no longer valid (Vargo and Lusch, 2008a). Gretzel *et al* (2015b:183) observe that 'any type of stakeholder can become a producer, consumer, intermediary depending on resources and connections rather than predefined roles.' Given the complex and dynamic nature of smart tourism ecosystems, it is increasingly difficult to identify relevant actors involved in the co-creation of value and services through ICTs. Hence, any socio-technological view of smart destinations cannot ignore the structural changes undergoing in tourist destinations and the complexity of smart tourism ecosystems, including the Digital Business Ecosystem (DBE).

2.2.2 The digital business ecosystem

The ecosystem concept applied to cities is consistent with the interconnected, networked, complex and dynamic environment of smart destinations. Cities can be seen as ecosystems entailing networks of abiotic (non-living) and biotic (living) components, such as parks, buildings transport and other infrastructures (Newman and Jennings, 2012). Practitioners

and scholars (Baggio and Del Chiappa, 2013; Jakulin, 2017) recognise the systemic nature of the tourism industry characterised by the collaboration and coordination of different resources, players, and institutions. The central notion of communities of living organism, along with non-living components of the environment, interacting as a system allows a holistic understanding of the interdependent relationships occurring in a specific context, rather than focusing on individual actors or elements (Rosen, 2000; Gretzel *et al*, 2015b). The analogies to the biological ecosystems are suggested by the dynamic interactions with a physical environment, loose relationships, flows of interdependent resources, diversity of species (actors) and structural adaptive changes (Pilinkienė and Mačiulis, 2014). In the business environment, 'an extended system of mutually supportive organisations' and individuals (communities of customers, suppliers, producers, competitors, institutions and other stakeholders) interact and 'come together in a partially intentional, highly self-organizing, and even somewhat accidental manner' (Moore, 1998:168). Thus, the business ecosystem can be described as an open networked system in which the relationship among "species" co-evolve to face new "organism" (actors or stakeholders) and environmental changes (Moore, 1993; Beritelli and Laesser, 2011). Considering the aim to co-create and deliver services to customers (Iansiti and Levien, 2004; Nachira *et al*, 2007), shared value among local communities, knowledge creation and open innovation emerged as drivers of the socio-economic advances, competitiveness and sustainability of business ecosystems (Kramer and Pfitzer, 2016).

The ecological metaphor of open, collaborative, and evolving business ecosystems should be distinguished from static forms of business networks. The clusters and districts are the context for competition between organisations and the positive spillover effect elicited by the diffusion of innovation and information flows (Porter, 1998; Audretsch and Feldman, 2004; Sainaghi and Baggio, 2017). The value networks emphasise the interactive web of relationships, the role of players and exchanges among them to create tangible and/or intangible value (Alee, 2003; Lusch *et al*, 2010; Baggio and Del Chiappa, 2014). Besides, business ecosystems consider a holistic view of the complex and adaptive business systems by focusing on the digital-physical networks evolution, rather than underlying mechanisms or structures (Peltoniemi and Vuori, 2004; Cassandras, 2016). In the same fashion, there is no centralised, distributed control or fixed roles in a digital ecosystem and technological agents (i.e. devices, platforms, software and databases) can form, or dissolve, different

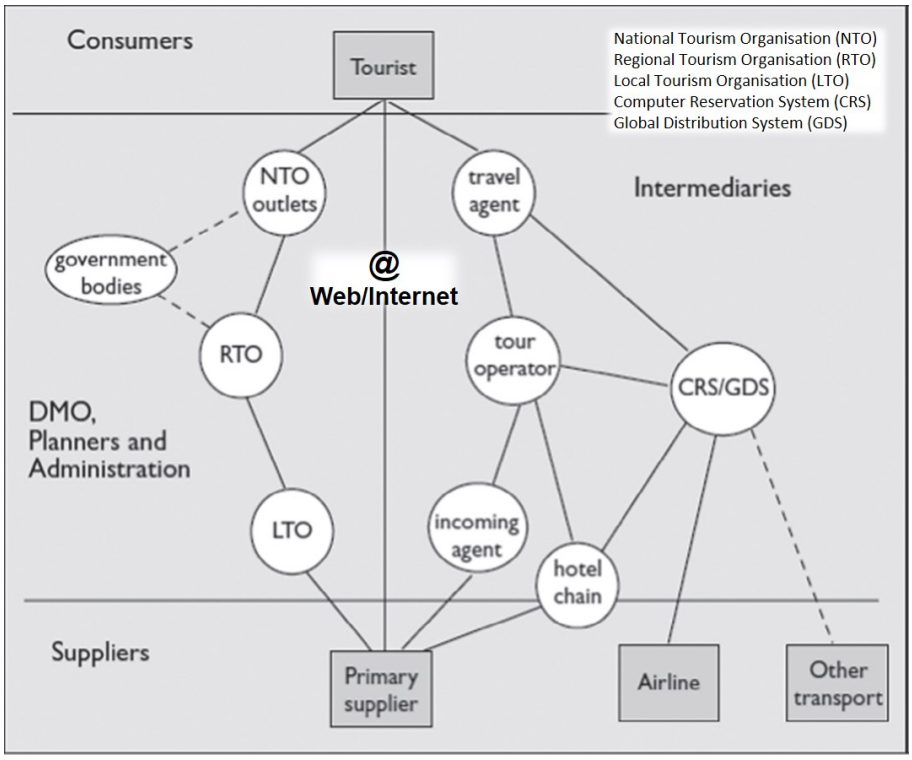
structures aligning to the changing environment (Briscoe and De Wilde, 2006). As Boley and Chang (2007:400) observe, the logic of client-server, peer-to-peer and/or web service network does not apply to digital ecosystems, because of the 'collective behaviour of [intelligent] agents or species interacting with each other and with the environment [to] generate a coherent functional global pattern'. Such a view of digital ecosystems is also consistent with the notion of *collective intelligence* enabled by the Internet. Given the impact of smart ICTs on business practices and processes, from a strategic and operational perspectives, the DBE concept has emerged as a combination of the business ecosystem with its digital representation (Nachira *et al*, 2007). In a digital business ecosystem, the "physical/tangible" component of business stakeholders, particularly SME, co-exists and co-evolves with its "virtual/digital" complementary equivalent as a single CAS (Stanley and Briscoe, 2010). As such, the DBE view provides the basis to understand the evolution of tourist destination ecosystems following the increasing adoption of smart technologies to foster innovation and competitiveness. To better understand smart tourism destination as a combination of the socio-technological and digital business ecosystem, it is essential to discuss the following key layers of smart tourism ecosystems.

2.3 The smart tourism ecosystem

The fragmented, heterogeneous, and interrelated system of SME and stakeholders (public and private) embedded in the socio-technological context of tourist destinations supports the notion of smart tourism ecosystem (Mill and Morrison, 2002; Scott *et al*, 2008; Gretzel, 2011). The integration of smart technologies into commercial and businesses processes has increased the complexity of the tourism distribution system (Kracht and Wang, 2010), with an impact on business models and marketing strategies (Pearce *et al*, 2004). The pre-web travel market system underwent a progressive and radical transformation of its value chain (Figure 6). Online intermediaries, like Expedia and Trivago, have emerged from an effective implementation of web-based technologies for travel services and transformed the configuration of tourist destination ecosystems. Interconnected players, interactions and openness are recognised as essential to support innovation and knowledge sharing in tourism ecosystems (Boley and Chang, 2007; Schaffers *et al*, 2011). Service coordination and process integration can be supported by distributed computing systems (e.g. Service Oriented Architecture) through dynamic data and information exchanges across tourist organisations at destination level (Chiu *et al*, 2009; Gretzel *et al*, 2015b). Clearly, Intelligent

systems can facilitate decision-making by ensuring contextual real-time information to travellers (e.g. weather, directions and location), and destination intelligence by enabling data collection, exchange and analysis (Borràs *et al*, 2014; Hopken *et al*, 2015; Buhalis and Foerste, 2015).

Figure 6. Web/Internet-supported tourism value chain system



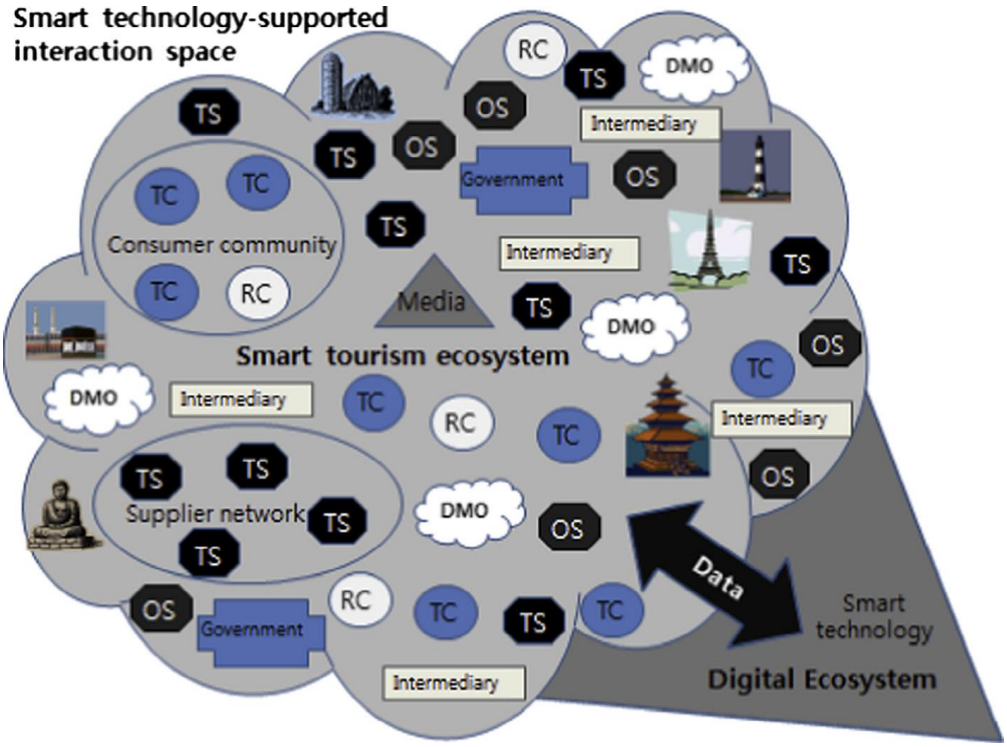
(Adapted from Gretzel *et al*, 2015b:560)

From a socio-technical perspective, the role of social media in the socialisation of ICTs has increasingly made tourists, residents, and organisations interactions more relevant to the DBE. Hence, the notion of social media ecosystems and the pertinent reference to tourists as value co-creators within the smart tourism ecosystem (Vargo and Lusch, 2010; Brandt *et al*, 2017). However, in smart tourism destinations, different ecosystems (social, business and technological) tend to overlap with boundaries that cannot be easily defined because 'physical and virtual components are structurally strongly coupled and co-evolve forming a single system' (Gretzel, 2011; Del Chiappa and Baggio, 2015:185).

As pointed out earlier, the combination of the physical and digital sphere within tourist destinations is a critical tenet of smart tourism, and any component thereof. Provided that there is a strong relationship between the two, any change occurring in the physical or virtual/digital domain can be deemed as mutually inclusive and spreads to the entire DBE

(Del Chiappa and Baggio, 2015; Gelter, 2018). Therefore, the tourist destination context involves a level of complexity that can hardly be compared to other ecosystems. Kracht and Wang (2010:746), for example, contend that 'tourism distribution did not have an utterly simple structure before the debut of the web' and 'it transformed from a complex one to a very complex one' in the light of the increased diversification of actors. This level of complexity enforces the shift from competition to cooperation, which in turn leads to a synergy between players and coordination of destination stakeholders.

Figure 7. Smart tourism ecosystem

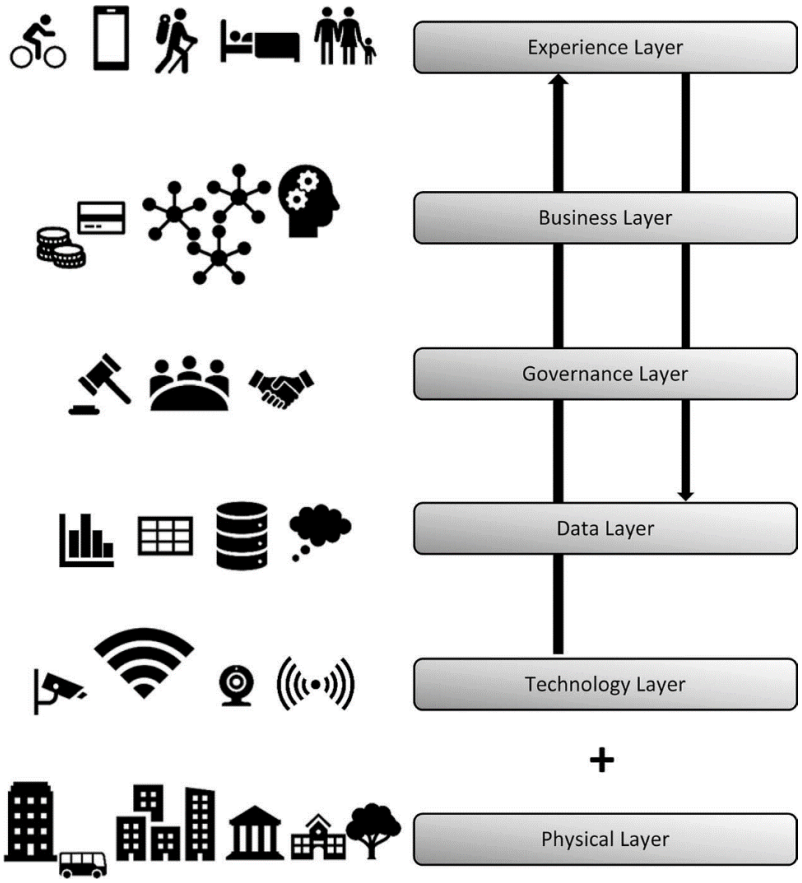


(Gretzel *et al*, 2015b:561)

In this respect, the smart tourism ecosystem can be depicted as a CAS of loosely coupled actors (Figure 7), with fluid roles and boundaries across the different types of providers, users and intermediaries (Gretzel, 2015b; Sainaghi and Baggio, 2017). Apart from the use of ecological metaphors, the attention has been mainly placed on identifying the elements, layers, and the relationships characterising the formation, evolution, and interdependency of STE. In line with the discussed definition of smart destinations (Section 2.2), the recent definition of smart tourism embodies a multi-layer model built upon the latest evolving conceptualisations of the socio-technical and DBE of destinations (Figure 8). As described by Gretzel and Scarpino-Johns (2018:265), 'the physical and technology layers support a

data layer, which in turn sustains a business and governance layer needed to ultimately facilitate a smart tourism experience layer'. The physical and digital elements are structurally interconnected and co-evolve to form a single system (Baggio and Del Chiappa, 2013; 2014), which can be defined as the cyber-physical and social environment whereby data are produced and flow throughout networked actors (Cassandras, 2016; Sun *et al*, 2016).

Figure 8. Smart tourism layer model



(Gretzel and Scarpino-Johns, 2018:266)

With reference to the business and governance layers, the socio-technological implications concern cooperation, collaboration, and the coordination of public-private relationships. Given the aforementioned complexity of the networked system of stakeholders (Baggio, 2011), smart governance has steadily gained attention in relation to policies and initiatives enabling the smart tourism value propositions and open innovation through collaboration and active participation in decision making (Castelnovo, 2016; Lara *et al*, 2016; Gretzel and Jamal, 2020). As the top layer (Figure 8), the smart tourism experience entails the value proposition, the consumption process and service enhancements, with insights generated

from data, information and ICTs-mediated interactions (Neuhofer *et al*, 2015; Buonincontri and Micera, 2016; Roy *et al*, 2019). Smart ICTs can be recognised as instrumental to STEs dynamics and intertwined with the socio-economic environment of destinations (Buhalis and Amaranggana, 2015; Del Vecchio *et al*, 2018), while data and knowledge are widely recognised as vital resources for each and all agents of the digital-physical and social ecosystem (Shaw, 2015; Xiang and Fesenmaier, 2017). Since 'smart destinations are destinations that successfully implement all smart tourism layers' of the smart ecosystems (Gretzel and Scarpino-Johns, 2018:267), it is crucial to the purpose of this research to consider data, information and knowledge as significant components to understand value creation in a smart tourism ecosystem.

2.3.1 The role of smart technology

Ever since the emergence of the web, any advancement in ICTs has attracted the interest of tourism researchers and practitioners (Leung and Law, 2007). In less than two decades, the constant evolution of online search technologies, booking engines, social networking, virtual communities and location-based services have profoundly changed the tourism industry structure and supplier-consumer relationship (Werthner and Klein, 1999; Buhalis and O'Connor, 2005; Navio-Marco *et al*, 2018). The integrated use of a large array of ICTs by suppliers and tourists have facilitated information exchanges and direct interactions, with impact on the role of intermediaries. Tourists can easily access information before travelling to destinations, make a reservation and pay online without using the traditional distribution channels (e.g. travel agencies and tour operators). On the other hand, online direct engagement with tourists have forced tourist suppliers to adapt their value chain to the electronic marketplace (Porter, 2001) and reconsider their business models (Buhalis, 2003; Li *et al*, 2017). With tourists being able to create online their own travel experience, from transportation to dining, new digital players have entered the market and challenged the traditional distribution network. Online travel agencies and meta search engines, like Expedia and Trivago, provide tourists with dynamic web searching tools to compare prices, check availability or combine products and services before and during their journey. Pre-Internet tourism organisations have progressively integrated ICTs into their business to disintermediate intermediaries and survive competition from digital players. Furthermore, the social web has laid the ground for the emergence of travellers' review players, such as TripAdvisor, which enable tourists to exchange opinions and information about tourism

and hospitality services at any stage of their experience. This has inevitably increased the bargaining power of tourists, who can easily choose between suppliers, compare pricing and influence decision making upon the quality of the services provided. Thus, the impact of ICTs, and particularly the Internet, on both marketing and strategic dimensions of the tourism industry have clearly affected the development and management of destinations product. From the technological perspective, the emerging smart tourism concept can be considered as the next step in the evolution from the pre-Internet traditional tourism and e-tourism (Table 1).

Table 1. E-Tourism vs Smart Tourism

	e-Tourism	Smart Tourism
Sphere	digital	digital (virtual) and physical (real)
Core technologies	web and wireless	smartphones, Internet of Things
Travel phase	pre- and post-travel	during trip
Lifeblood	information	big data
Paradigm	interactivity	Technology-mediated co-creation
Structure	Value chains / intermediaries	ecosystem
Exchange	B2B, B2C, C2C	Public-private-consumer collaboration

(Adapted from Gretzel *et al*, 2015a p. 182)

There is a large body of research that refers to e-tourism as a concept encompassing the disruptive application of web tools and ICTs to travel and tourism (Buhalis and Law, 2008; Baggio, 2014; Navío-Marco *et al*, 2018). According to Buhalis (2003:76), 'e-tourism reflects the digitisation of all processes and value chains in the tourism, travel, hospitality and catering industries.' Although this concept has well captured the technological change and its implications for tourism at both tactical and strategic level (Buhalis and Law, 2008), it appears to be limited in addressing the diverse, fragmented and powerful development of smart technology (Buhalis, 2019). For instance, the integration of sensors and beacons into destination infrastructure (e.g. buildings and roads) and local attractions (e.g. museums and events) cannot be fully explained by the digital interactivity paradigm of e-tourism. This is broadly due to the widespread diffusion of wireless devices and mobile applications supporting technical innovations for ubiquitous interconnectivity and access to the web. Along with smartphones, cloud computing and RFID tags, to name a few, context-based technologies are increasingly blurring the digital and physical boundaries by allowing the interaction between objects as well as objects and people (Hunter *et al*, 2015). Seamless

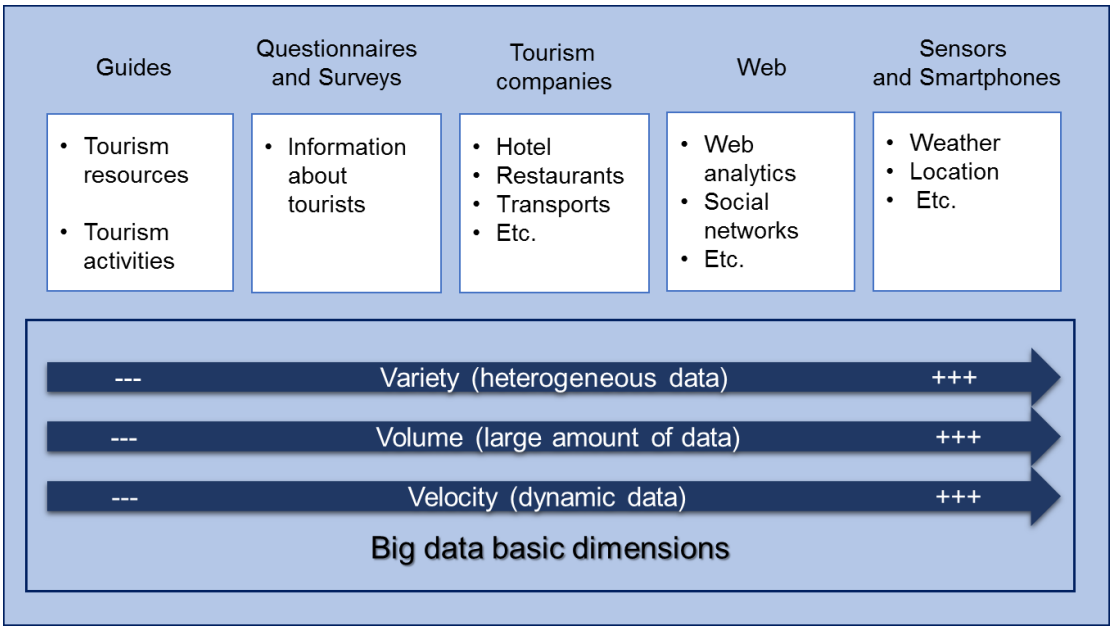
connectivity and the pervasive presence of objects interacting one another through the Internet is, therefore, gradually changing the tourism industry structure in a different way than before. Smart ICTs enable the active role of tourists in creating their own experiences, while empowering the management of destination by interconnecting public and private organisations with one another. Interconnected private and public tourism organisations can provide better service by engaging visitors and local residents in real time, collecting, exchanging, and processing almost any kind of data and information. On the other hand, tourists and residents can access and share any kind of information about the destination and interact with local service providers in real time to co-create actively their experience. Given the synchronisation, interoperability and the combined use of different advanced technologies define the technology as "smart" (Hojer and Wangel, 2015), the Internet of Things (IoT) can be recognised as a good example of smart ICTs providing the infrastructure for the development of smart destinations (Lamsfus and Alzua-Sorzabal, 2013). Through the integration of ICTs and the networked interconnection of social and physical objects (Gubbi *et al*, 2013; Atzori *et al*, 2014), the IoT has enables the transmission of any type of data that tourists and residents can access, collect and share in real time, while exploring a destination (Schaffers *et al*, 2011; Buhalis and Amaranggana, 2015). Hence, the huge amount of data produced by *in situ* activities, which tourism organisations and destinations could in turn collect, exchange and process to differentiate and compete (Kitchin, 2014a; Marine-Roig and Clavé, 2015).

2.3.2 Data, information and knowledge

Several studies have recognised the importance of data, information and knowledge in the tourism industry (Fuchs *et al*, 2014; Xiang and Fesenmaier, 2017; Sigala *et al*, 2019), as well as the relationship between them (Kettinger and Li, 2010; Hopken *et al*, 2015). Data play a key role in enhancing the decision-making of smart destinations (Dos Santos Romualdo Suzuki, 2016). Tourists and local residents using location-based services, web services and social media generate a large amount of diverse decision-relevant data that organisations and destinations systematically collect, exchange and analyse with the aim to turn them into valuable insights and knowledge (Hopken *et al*, 2015; Ardito *et al*, 2019a). At the same time, consumers' choices depend on dynamic and independent sources of data, which are produced and shared as never before by other consumers and the physical environment (Yoo *et a*l, 2015; Rihova *et al*, 2015). The relevance of such data has been encouraged by

smart technologies being embedded into tourist destinations and business processes (such as searching, booking, and paying). In smart destinations, the exponential growth of data and information stemming from heterogeneous sources in real time (Figure 9) can support business intelligence and advanced analytics to enhance competitiveness through better governance, quality of services, innovation and value co-creation (Kitchin, 2014a; Celdran Bernabeu *et al*, 2016; Xiang and Fesenmaier, 2017).

Figure 9. Main big data sources at smart tourism destination



(Adapted from Invat.tur and IUIT, 2015)

This multidimensional set of data known as big data is widely considered as an opportunity for tourism organisations and destinations able to provide personalised smart experiences, create value for all stakeholders and improve their competitiveness by analysing data and act on it (Neuhofer *et al*, 2015; Xie *et al*, 2016; Del Vecchio *et al*, 2018). Hence, the stress on the key role of big data and business intelligence in smart tourism destinations. Several scholars (Gretzel *at al*., 2015a; Xiang and Fesenmaier, 2017; Sigala *et al*, 2019) agree that the vast amount of data at the core of all smart tourism activities can provide significant benefits by enabling business intelligence and meaningful insights. Alongside this positive view of big data in smart tourism, however, there are social, technological, and economic issues to be considered. First, firms operating in a smart environment need to introduce new business models, with an impact on the investments in data technologies (e.g. data warehouses and software) and proper highly-skilled workforce to analyse and interpret

data (Debortoli *et al*, 2014; Morabito, 2015). Second, the sensitive data and information shared online, like the location, raise concern about privacy and security (Masseno and Santos, 2018), with legal, moral, socio-technical and political implications for their use in pervasive analytics strategies (Tallon, 2013; Punagin and Arya, 2015). Data protection laws and rules are developing worldwide, but unique demands for different regulations in each region add complexity to this issue. Third, new forms of digital divide can emerge from the expensive and difficult access to big data for those who cannot afford it, whence the biased data and ecological inequalities issue (Minghetti and Buhalis, 2010; Boyd and Crawford, 2012). Finally, rather than volume and velocity, the sources reliability (veracity), changes in data flow rates (variability) and fragmentation (variety) of data are deemed as crucial problems of big data (Bean, 2016; Sun *et al*, 2016).

Provided that the volume of data and information is nothing new (Shenk, 1997; Blair, 2011) and all big data dimensions are interdependent (Gandomi and Haider, 2015; Del Vecchio *et al*, 2018), major challenges arise from 'the need to combine structured and unstructured analysis techniques to extract meaningful outcomes' (D'Amore *et al*, 2015:170). The smart destination context can heighten the level of variety characterising big data. The use of social media on the move and through different devices, before during and after visiting a destination, tend to increase the variability and the amount of unstructured data (e.g. reviews, images, audio, video), which are currently outnumbering structured data, like sensor or transaction data (Cukier, 2010; Davenport, 2014; De Mauro *et al*, 2016). To date, few studies have addressed this issue to propose integrated analytical solutions to tourist destinations (Fuchs *et al*, 2014; Miah *et al*, 2017), despite the growing interest in big data and attention to business intelligence in tourism (Baggio, 2016; Mariani *et al*, 2018). From a strategic and operational perspective, this is relevant to the integration of big data and open data (Kitchin, 2014b), with the latter being essentially based on public sources of data that anyone can access, use and/or share (Table 2). While big data claim to shape and enhance smart tourism experiences (Femenia-Serra *et al*, 2019), open data may foster innovation and value creation by supporting a cooperative and collaborative environment (Mellouli *et al*, 2014; Celdran-Bernabeu *et al*, 2018). Clearly, the business data entailing commercial value for firms, and the personal/sensitive data protected by the law, are not publicly available or open to sharing. Still, open data have been highly valued in smart destinations management in terms of their potential use for smart governance, knowledge

sharing and value creation (Pereira *et al*, 2017), even if 'the impact of Open Data technologies will peak in around 5-10 years' (Ivars-Baidal *et al*, 2019:1593) and old business models have yet to be changed into appropriate ones (Pesonen and Lampi, 2016).

Table 2. Categorisation of open tourism data

Open data type	Description	Where data has been used
Geographical data	GPS-locations	Mobile applications, websites
Event data	Description of events, bands playing, timetables, even type	Mobile applications, websites
Visitor statistics	Number of overnights	Mobile applications, websites
Supply statistics	Number of businesses, types of businesses, number & information on attractions & museums	Mobile applications, websites
Survey data	Data from survey studies	Mobile applications, websites, academic and business research
Supply information	Information on travel destinations, attractions, restaurants, and happenings	Mobile applications, websites, academic and business research
Transit data	Timetables	Mobile applications, websites
Governmental data	Tax distribution & collection	Mobile applications, websites, academic and business research
All of the above		Smart Tourism City, augmented reality applications, services that combine data from several sources

(Pesonen and Lampi, 2016:online)

The potential of big data depends on an effective interpretation of data by highly skilled analysts and the implementation of advanced and integrated analytical systems capable to manage all types of data produced within smart destinations. In other words, big data and Business Intelligence are viewed as highly complementary (Baggio, 2016). Big data provide insights that enhance business intelligence practices (e.g. market analysis), which, in turn, support big data analytics through interpretations (Liebowitz, 2013; Höpken *et al*, 2015). Big data have also been recognised as driver of knowledge creation in smart tourism destinations. The idea that data and information are the sources of knowledge has been widely accepted in knowledge management literature (Lueg, 2001; Alavi and Tiwana, 2003; Tian, 2017) and tourism research (Fuchs *et al,* 2014; Hopken *et al*, 2015; Sheenan *et al*, 2016). Even though epistemologically plausible (Spender, 2008; Jennex, 2017), the data-information-knowledge progression have raised criticism, particularly the 'information-to-

knowledge move' (Weinberger, 2010:online). Contrary to Ackoff (1989) Data-Information-Knowledge-Wisdom (DIKW) model, Spender (2007; 2008:164) suggested the *knowledge as data*, *knowledge as meaning* and *knowledge as practice* typology to move beyond the 'cognitive domain of information' affecting most of IT-based knowledge management models. In a similar way, Brown and Duguid (2001) advocated a socially based view of organisational knowledge and argued that knowledge is embedded in practices across organisations. This perspective suggests that perhaps knowledge, as for learning, is a social phenomenon based on managerial practices, rather than a "property" or an asset retained in organisations' boundaries and exchanged like any other asset. Conversely, the notion of knowledge in smart tourism destinations has been mainly associated with the data and information-intense nature of the tourism industry, which is affected by the adoption of advanced ICTs increasing the amount of data produced, shared and processed (Werthner and Klein, 1999; Buhalis and Law, 2008).

The entwined relationship of data, information and knowledge can actually define the smart configuration of tourist destinations. By ascribing tacit knowledge to the people's subjective experiences (e.g. residents and visitors) and explicit knowledge to the "codified" knowledge flowing across organisations and people (Pyo, 2005; Cooper, 2018), knowledge-based systems have been increasingly suggested as the potential solution to convert knowledge from tacit to explicit and extract it from data and information available at the destination (Fuchs *et al*, 2013; Hopken *et al*, 2015; Femenia-Serra and Ivars-Baidal, 2018). As such, smart ICTs, like AI and IoT, are instrumental in nurturing knowledge creation and enabling knowledge transfer across stakeholders for the creation of an open innovation ecosystem and better decision-making (Shaw and Williams, 2009; Del Chiappa and Baggio, 2015; Trunfio and Campana, 2019). Therefore, the identification of the knowledge-based destination as the open and networked environment where information and knowledge are widely shared and accessible to all actors through mechanisms of collaboration and participation in innovation processes (Racherla *et al*, 2008; Ardito *et al*, 2019a; Williams *et al*, 2020). This implies that knowledge need to be coded to be transferred across tourism ecosystems, whose smartness has been correlated to the capability of making strategic decisions and creating value through an effective integration of knowledge into related processes and practices to gain competitiveness.

2.4 Chapter conclusions

This chapter provided a review of the current research efforts in the conceptualisation of smart tourism and smart destinations. Despite being an emergent, multidimensional, and dynamic phenomenon that still needs an agreed definition, it has been possible to identify some underlying concepts and traits characterising smart tourism. The smart experience, smart business ecosystem and smart destination have been deemed as the fundamental pillars to understand the latest progression from the classical view of e-tourism, with data and smart ICTs as the main drivers. Such a transformational evolution has been particularly captured by the application of smart tourism to cities as transformation of the traditional approach to tourist destination.

Drawing on the smart city principles, the conceptualisation of smart destinations has been developing through the ecosystem "metaphor" to exemplify the structural complexities of the relationships between actors (i.e. organisations, tourists, residents, and communities) and resources, either tangible or intangible. As such, a smart tourism destination can be understood as a smart ecosystem based upon the combination of its socio-technological and digital business ecosystems. Despite the significant role of data, information and smart technologies, the integration of smartness into destinations cannot ignore social systems and socially based knowledge practices to foster innovation and value co-creation. This is consistent with an interpretation of smart tourism ecosystems through data, information, smart ICTs, and knowledge as its determinant components. In this smart service ecosystem context, the value co-creation highly depends upon the integration of all components and recognised essential to service innovation and the competitiveness of a destination.

Chapter 3. Value creation in smart destinations

As smart tourism ecosystems, destinations are characterised by the integration of smart ICTs, 'intensive information sharing and value co-creation' (Buhalis, 2015:online; Boes *et al*, 2016). The process of co-creation of mutual value across all stakeholders is, therefore, central to the smart destination developments. This will be hereby discussed by exploring the literature related to the systemic view of value co-creation encompassing the S-D logic and the Service Science meta-theoretical orientation. Given the significance of the service ecosystem in contextualising the value creation process, the notion of value embedded in social systems (value-in-social-context) and shaped by social forces will be addressed with particular attention to the smart tourism ecosystem underlying factors.

3.1 S-D logic, Service Science and value creation

S-D logic can be defined as a service-centred marketing view that marks a conceptual shift from conventional goods-based exchange to service-based exchange (Vargo and Lusch, 2004; 2008b; 2017). According to this view, all market actors exchange service, rather than goods, by integrating their resources, with the common purpose of co-creating value. Even if goods are exchanged, they ultimately deliver service (Vargo and Lusch, 2004; Lusch and Vargo, 2014b). In S-D logic, the value creation process embodies the distinction between the goods-based and the service-centred view of markets, given that 'firms propose value through market offerings and customers continue value-creation process through use value', rather than exchange value that is 'embedded' in goods and 'added by enhancing or increasing attributes' (Vargo *et al*, 2008:148). Hence, the difference between the S-D logic *value in use*, and the more recently *value in context*, and the G-D logic of *value in exchange* (Vargo and Lusch, 2004; Chandler and Vargo, 2011). The former refers to the use of intangible (or operant) resources, like knowledge and skills, and the role of the context in creating value, while the latter stresses nominal value (e.g. price) of exchanged goods and the importance of tangible (or operand) resources (Constantin and Lusch, 1994; Vargo and Lusch, 2008b).

This mindset shift, from G-D logic to S-D logic, entails reassessing the purpose and the role of organisations in the value creation process (Table 3). With the basic idea of value being co-created with customers and through service exchange for the benefit of another party (Saarijärvi *et al*, 2013), firms are essentially driven by collaborative and active approach to

service provision that is no longer distinct from products or units of output (Vargo and Lusch, 2008b). Thus, the main purpose of a service provider lies in assisting customers in their own value creation processes through the integration of competences and network interactions with other value-creation partners (Grönroos, 2008; Gummesson and Mele, 2010). The move from the transactional to relational exchange, and the subordination of goods-marketing concepts to service(s), are at the centre of this re-conceptualisation of service management and marketing. According to Vargo *et al* (2010a:152), the primacy of service over goods should be understood in terms of classification and function, instead of importance, and 'value creation is a process of exchanging, integrating, and generating resources, which requires interactions and implies networks'.

Table 3. The transition from G-D logic to S-D logic.

Good-Dominant (G-D) logic	Service-dominant (S-D) logic	Transitioning	
		From	To
Making something (goods or services)	Assisting customers in their own value creation processes	The purpose of firm activity as making something (goods or services)	A process of assisting customers in their own value-creation processes
Value as something that is produced	Value as something that is co-created	Value as something produced & sold	Value as something co-created with the customers and value-creation partners
Customers as isolated entities	Customers in the context of their own networks	Customers isolated from each other	Networks between customers
Firm resources primarily as "operand"	Firm resources primarily as "operant"	Primarily tangible resources	Primarily intangible resources
Customers as targets	Customers as resources	Customers as marketing targets	Customers as resources in creating value
Primacy of efficiency	Efficiency through effectiveness	Efficiency of production is paramount	Increased efficiency delivered through effectiveness in service delivery

(Adapted from Evans, 2016; Vargo and Lusch, 2008b)

I has been argued that recognising goods as mechanism of service provision overrule the "anachronistic" distinction between services (as intangible, heterogeneous, inseparable and perishable) and the goods of G-D logic (Parry *et al*, 2011; Vargo and Lusch, 2008b). On the other hand, the role of markets as networked interactions has been in value creation and service exchanges (Grönroos, 2006; Ballantyne and Varey, 2006; Gummeson, 2006), while their centrality in S-D logic have become explicit over time (Vargo *et al*, 2010b).

Whereas users and suppliers of goods and services develop their networks of relationships through interactions, markets actualise value creation by enabling exchange activities and knowledge application for mutual benefit. Even if the G-D logic equally concerns relational exchanges and interactions, the emphasis on "marketing-to-customers" over "marketing-with-customers" fosters a heterogeneous and fragmented view of marketing phenomena (i.e. B2B, B2C and C2C) based on value distribution (Webster, 1992; Norman, 2001; Vargo and Lusch, 2017). Thus, S-D logic can be seen as a unifying theory of marketing built upon 11 Foundational Premises (FPs) representing the service centricity (FP1-FP5), value co-creation (FP6-FP10) as key and evolving concepts alongside institutions and institutional arrangements (FP11) supporting service ecosystems conceptualisation (Table 4).

Table 4. Foundational Premises of S-D logic

Foundational Premises		Explanation/Justification
FP1	Service is the fundamental basis of exchange	Service as application of operant resources (knowledge and skills) is the basis of all exchange. Service is exchanged for service.
FP2	Indirect exchange masks the fundamental basis of exchange.	Service is provided through complex combinations of goods, money, and institutions, and is not always apparent as the basis of exchange.
FP3	Goods are distribution mechanism for service provision.	Goods (both durable and non-durable) derive their value through use and the service they provide.
FP4	Operant resources are the fundamental source of competitive advantage.	The comparative ability to cause desired change drives competition.
FP5	All economies are Service economies.	Service (singular) is only now becoming more apparent with increased specialisation and outsourcing.
FP6	The customer is always a co-creator of value.	Value creation is interactional.
FP7	The enterprise cannot deliver value, but only offer value propositions	The firm can offer its applied resources and collaboratively create value following acceptance, but cannot create or deliver value alone.
FP8	A service-oriented view is inherently customer oriented and relational	Service is defined in terms of customer determined co-created benefit and it is inherently customer oriented and relational.
FP9	All social and economic actors are resource integrators.	The context of value creation is networks of resource-integrators.
FP10	Value is always uniquely and phenomenologically determined by the beneficiary.	Value is idiosyncratic, experiential, contextual, and meaning laden.
FP11	Value cocreation is coordinated through actor-generated institutions & institutional arrangements	The contextual nature of value creation is defined by the structure and dynamics of human and social activities influenced by interrelated norms, rules, and beliefs.

(Vargo and Lusch, 2008a:7; 2016).

Since their introduction by Vargo and Lusch (2004), FPs propositions were extended and revised through later works to integrate comments, issues and criticism emerging from the academic debate over time (Vargo and Lusch, 2008a; 2017). The adjustments were related to the lexical definitions affecting the premises (e.g. Kohli, 2006), managerial phrasing in defining markets (e.g. Venkatesh *et al*, 2006) as well as networked and interactive nature of value (Achrol and Kotler, 2006; Grönroos, 2006; Gummeson, 2006). According to Brodie *et al* (2019:4), S-D logic's evolution 'can be grouped into three periods' (Table 5). Despite being undeniably influential and evolving over time, S-D logic represents 'a mind-set and an organizing framework rather than a theory' (Vargo and Lusch, 2008b:257), thereby it is difficult to be tested and applied (Evans, 2016). Indeed, Vargo and Lusch (2004; 2006; 2008a:1) acknowledge the integrative nature of the logic and its 'open-source evolution'.

Table 5. S-D logic's development periods

Formative period (2004-2007)	Vargo and Lusch (2004) initiated this period by providing an alternative perspective of markets and marketing and thus challenged the traditional product-centric Good Dominant (G-D) logic. S-D logic, at this stage, articulated eight foundational premises. Academic articles, published in this period debated and clarified what was meant by S-D logic.
Refinement Period (2008–2011)	Vargo and Lusch (2008a) extended S-D logic to 10 foundational premises. The published articles in this period refined, clarified, and broadened the S-D logic narrative and the number of authors and journals referring to S-D logic increased significantly.
Advancement Period (2012 onwards)	Vargo and Lusch (2016) introduced one new foundational premise (Value creation is coordinated through Institutions and Institutional arrangements) and assigned the now eleven premises to five axioms (FPs 1, 6, 9, 10, 11). The number of authors further expanded, and the range of articles in marketing and service journals and other disciplines exponentially increased. The published work in this period broadened the S-D logic discourse and the contexts it was applied in. Further, initial empirical investigations shaped and verified its conceptual understanding.

(Brodie *et al*, 2019:4).

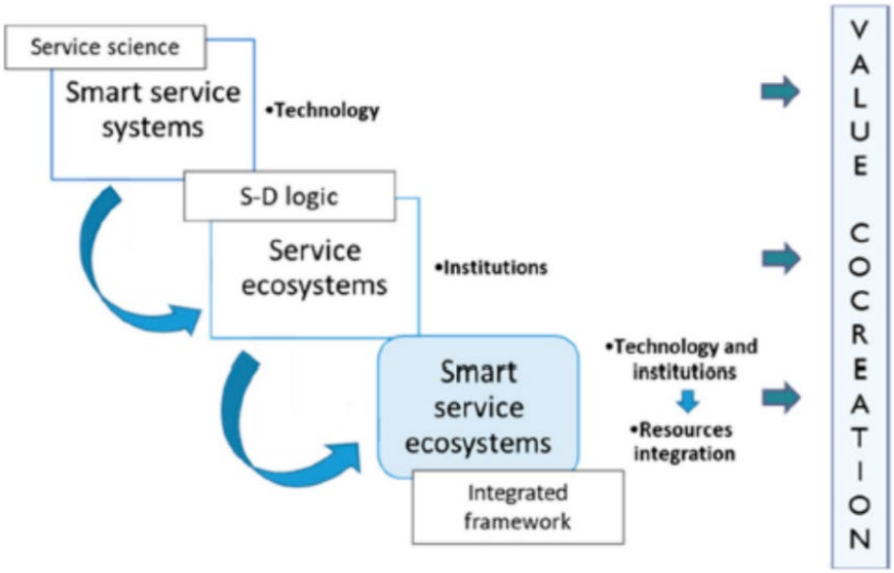
For instance, the notion of service as enabler of economic exchange (FP2, FP3 and FP4) is adopted and adapted from Bastiat and Huszar (1964); the customer as value co-creator concept (FP6) from Prahalad and Ramaswamy (2004) before expanding the co-creation to value; whereas the notion of resource integration (FP9) from Norman (2001). Marketing scholars (Brodie *et al*, 2006; Brown, 2007; O'Shaughnessy and O'Shaughnessy, 2009) questioned the S-D logic by addressing its conceptual, abstract, and holistic nature. While recognising the validity of the logic, other scholars (Fisher and Smith, 2011; Hilton *et al*,

2012; Campbell *et al*, 2013) have similarly criticised the superordinate classification of operant resources over operand ones and the misinterpretation of co-creation and co-production of value. In advocating Service Logic (SL), the so-called Nordic School of service management focuses on managerial implications of service-centred marketing by arguing that an all-encompassing conceptualisation of value creation prevents clear understanding of the co-creation process and analytical development (Grönroos, 2006; 2008; Grönroos and Gummerus, 2014). Grönroos and Voima (2013) suggest that co-creation is a function of direct and indirect interactions leading to different forms of value creation. Suppliers can be value facilitators 'aiming at producing an output that supports or facilitates the customer's value-creating processes, while customers outside the sphere of interaction can be independent creators of value (Grönroos, 2011a:244). The value co-creation entails processes in which firms and customers directly and willingly interact and co-operate (Grönroos, 2008). Although value is actualised in contextual networked relationships and interactions across resource integration actors (Gummeson, 2006; Gummesson and Mele, 2010), it does not automatically imply that 'relationship and interactions *per se* increase customer value, or that relationship marketing is a panacea for competitive advantage' (Grönroos, 2011a; Kowalkowski 2015:57). In both SL and S-D logic, the meaning of service as basis for exchange, the perspective on value and value creation as well as the integration of specialised knowledge and skills are basically the same and so similar to be separately explored (Grönroos and Gummerus, 2014).

The S-D logic perspective of networked and interactive markets can also be found in SL, with a slightly different approach to the contextualisation of value. In contrast to S-D logic "*supplier-centric*" view of marketing, the Nordic School tends to advocate the customer-dominant logic or customer-focused approaches (Grönroos, 2011b; Grönroos and Voima, 2013; Heinonen *et al*, 2013). Considering the networked nature of society and markets (Castells, 2011; Shaw, 2015), an effective and systematic understanding of value co-creation in smart destinations cannot ignore the contextualisation of value associated with the service ecosystem concept (Akaka *et al*, 2012; 2019; Ng and Wakenshaw, 2018). The *value in context* concept (Chandler and Vargo, 2011:36) relies on the same insights of the Industrial Marketing and Purchasing (IMP) group and the many-to-many marketing view of Gummesson (2006), even if they stress 'interactions and relationships, rather than value creation'. These marketing approaches share the same view of the relationship between

context, markets and value emerging from the resource networks convergence. Hence, the conceptualisation of interrelated systems of service exchanges contextualising the co-creation of value and resource integration processes. Lusch and Vargo (2014a:161) define service ecosystems as the 'relatively self-contained, self-adjusting system(s) of resource-integrating actors connected by shared institutional arrangements and mutual value creation through service exchange'. S-D logic reconceptualise 'the supply chain in terms of a network of available service systems, each representing distinct (mostly operant) resources' (Lusch *et al*, 2008:11). This view broadens the sphere of value co-creation to include socio-economic actors as resource integrators that should be able to adapt to the complex and dynamic social system(s) to create value (Lusch, 2011; Lusch and Vargo, 2012a; Edvardsson *et al*, 2018).

Figure 10. Smart service ecosystems integrated framework



(Polese *et al*, 2018 p. 148)

Similarly, the Service Science perspective (Chesborough and Spohrer, 2006) defines service systems as 'a configuration of people, technologies, and other resources that interact with other service systems [e.g. companies, families, cities and governments] to create mutual value' (Maglio *et al*, 2009:395). Spohrer *et al* (2008b:72) also suggest that 'service systems are a value-coproduction configuration of people, technology, and value propositions connecting internal and external service systems and shared information (e.g. language, laws, measures and methods)'. While S-D logic focuses on the structural role of institutions

in service ecosystems (i.e. rules, norms, meanings, symbols, practices, and similar aides to collaboration) (Vargo and Lusch, 2016:6), Service Science emphasises the contribution of technology to the co-creation of value as enabler of information sharing across service systems (Maglio and Spohrer, 2008; Barile and Polese, 2010). However, within the service ecosystem view, 'technology is considered to be directly linked to institutions' influencing its application and use as a dynamic resource conveying knowledge and innovation (Akaka and Vargo, 2014; Vargo *et al*, 2015; Vargo and Lusch, 2016:11). The systemic view of value creation and the service systems concept proposed by Service Science has been extended by S-D logic to conceptualise service ecosystems and smart service ecosystems (Figure 10). While the S-D logic approach to service and value is essentially theoretical and entailing a higher level of conceptual abstraction, Service Science 'aim at providing a practical basis for the application of these new service-oriented foundational concepts' (Polese *et al*, 2018:141).

Table 6. Value in Service Science

The value concept	Authors
'[In service systems] participants coproduce value directly or indirectly with other service systems'	Spohrer *et al*, (2007:72)
value co-creation as a value-proposition-based interaction mechanism	Spohrer *et al* (2008a:6)
Value is improvement in a system, as judged by the system or by the system's ability to fit an environment.	Spohrer *et al* (2008b:110)
Value-cocreation phenomena are both a mundane and a profound aspect of our artificial (human-made) world.	Spohrer and Maglio (2010a:6, 23)
Value propositions are at the heart of value-cocreation interactions. […] Only together can the customer and the provider cocreate value.	
'Service is value cocreation. […] Value cocreation is a joint activity that depends on communication'.	Maglio and Spohrer (2013:667)
'Value propositions coordinate and motivate resource access across service system entities'	
'Autonomous technologies call into question the foundation of our understanding of service as value cocreation'	Maglio (2017:2)

S-D logic has been recognised as a pertinent theoretical foundation of Service Science, which take a slightly different view on value and value creation (Table 6). Vargo and Akaka (2016) address several misconceptions in Service Science about S-D logic, such as service

meaning, service economies, and the distinction between co-creation and co-production of value that can be attributed to a latent G-D logic influence. However, the continuous incorporation of the S-D logic conceptualisation, such as value co-creation and resource integration (Spohrer *et al*, 2007; Maglio and Spohrer, 2008), suggests that Service Science and S-D logic can be seen as complementary views of value creation from a networked and systemic perspective (Vargo *et al*, 2008; Vargo and Akaka, 2012; Vargo *et al*, 2010a). This study accordingly aligns with both S-D logic and Service Science perspectives as combined development of ecosystems-oriented science of service (i.e. a multidisciplinary approach to service and not in terms of basic science) recognising value creation, data, information and knowledge at its core.

3.2 Service ecosystems and the value-in-social-context

The concept of value in service marketing and management stems from early philosophical thoughts across classical economic philosophy and more recently in marketing literature (Vargo *et al*, 2008). The Aristotelian view of value for different things (e.g. shoes) in relation to their qualitative (e.g. colour) and quantitative (e.g. pairs/number) attributes defining use-value (qualitative) and exchange value (quantitative) was argued by classic economists like Adam Smith and Karl Marx through the distinction between *value in use* and v*alue in exchange* (Dixon, 1990; Fleetwood, 1997). The *value in exchange* has been recognised as transactional value, or the potential value that 'might represent expected utility', while the value in use embodies the 'actual' utility that can be experienced and determined by the consumers through use (Grönroos, 2011b; Lusch *et al*, 2008:12). For instance, the "real" value of a smartphone (value in use) can only be appraised by customers through its use after paying a market price for it (exchange value). Goods are, therefore, 'service-delivery appliances' for customers to derive value and tools for application of resources (Vargo and Lusch, 2006:49). Providers (e.g. travel agencies) can propose value through their offering (value proposition), which might be accepted by the customer who will eventually create value in use and complete the value creation process (Grönroos, 2000; Norman, 2001; Vargo and Lusch, 2004; 2008a). This process implies interactions and resources integration across service providers, network partners and customers to co-create value. Considering that 'consumers increasingly engage in the processes of both defining and creating value' (Prahalad and Ramaswamy, 2004:5), Vargo and Lusch (2004) introduced the concept of value co-creation to acknowledge the active involvement of customers as well as explain

how the value in use emerge from the relationship between actors and the application of operant resources (knowledge and skills). Table 7 shows the main tenets underpinning the move from G-D logic to S-D logic in terms of value creation. S-D logic clearly distinguishes between co-production and co-creation of value, which are recognised to be two nested components of value co-creation (Lusch and Vargo, 2006). Hence, the description of value co-creation as an all-encompassing process including firms and customers' value creating activities in which 'the customer is always a co-creator of value' (FP6) and the 'value is always uniquely and phenomenologically determined by the beneficiary' (FP10) (Vargo and Lusch, 2008a:7).

Table 7. G-D logic vs S-D logic on value creation

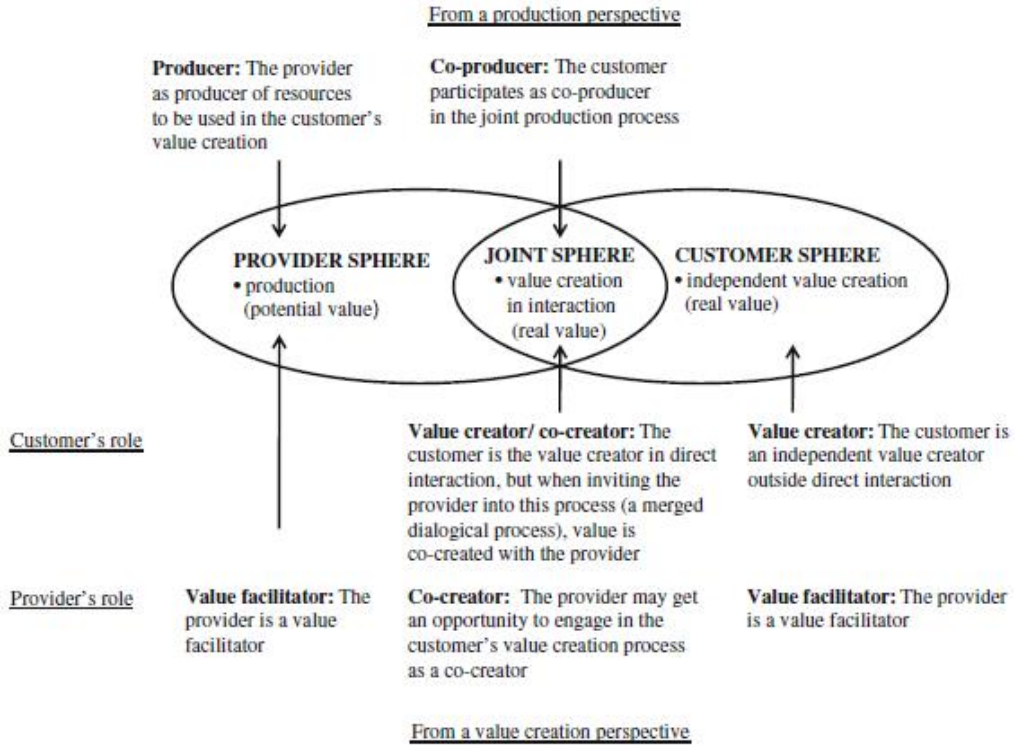
	G-D logic	S-D logic
Value driver	Value-in-exchange	Value-in-use or value-in-context
Creator of value	Firm, often with input from firms in a supply chain	Firm, network partners, and customers
Process of value creation	Firms embed value in "goods" or "services", value is added by enhancing or increasing attributes	Firm propose value through market offering, customers continue value-creation process through use
Purpose of value	Increase wealth for the firm	Increase adaptability, survivability, and system wellbeing through service (applied knowledge and skills) of others
Measurement of value	The amount of nominal value, price received in exchange	The adaptability and survivability of the beneficiary system
Resources used	Primarily operand resources	Primarily operant resources, sometimes transferred by embedding them in operand resources-good
Role of firm	Produce and distribute value	Propose and co-create value, provide service
Role of goods	Units of output, operand resources that are embedded with value	Vehicle for operant resources, enables access to benefits of firm competences
Role of customers	To 'use up' or 'destroy' value created by the firm	Co-create value through the integration of firm-provided resources with other private and public resources

(Vargo *et al*, 2008:148)

As "subordinate" component of value co-creation, co-production captures 'participation in the development of the core offering itself' (Lusch and Vargo, 2006:284). Furthermore, customer's 'involvement in "co-production" is optional and can vary from none at all to extensive co-production activities by the customer or user' (Vargo and Lusch, 2008a:8). For instance, the IKEA customers can collect and assemble furniture or have the assembled product delivered to his or her address. While some authors (Payne *et al*, 2008) use the

terms interchangeably, others (Ballantyne and Varey, 2006) argue that co-creation and co-production are distinct and unconnected because the former entails interaction to create value and the latter requires knowledge and skills. Grönroos (2008; 2011b) distinguishes between the generation of potential value, or value facilitation, by the firm and value creation as *value in use* created by the customer, without any superordinate relationship (Figure 11). Since the customer creates "real" value (value in use) through consumption of goods and services, the firm can only play the role of facilitator of the value creating activities without being included in the same analysis of the process (Grönroos and Voima, 2013).

Figure 11. Value creation sphere (firm-customer)



(Grönroos and Voima, 2013:142)

However, Vargo and Lusch (2004; 2006; 2008b; 2011) have established that the producer-consumer distinction no longer applies to service systems and service-centred businesses because of the continuous co-creation process whereby 'all participants contribute to the creation of value for themselves and for others' (Vargo *et al*, 2008:149). Even though the 'separation of production and consumption is not a normative goal' (Vargo and Lusch, 2004:11) and several scholars (Firat and Venkatesh 1993; Ramirez, 1999; Prahalad and Ramaswamy, 2004; Payne *et al*, 2008) advocate the producer-consumer equivalence, the

S-D logic holistic and positive view of co-creation has been questioned for overlooking complexity of the value co-creation process and for its conceptual ambiguity (Grönroos, 2011b; Hilton *et al*, 2012). This kind of critiques are mainly related to value co-destruction issues, the nature of value co-creation and potential asymmetries. With rare attempts to include value co-destruction into S-D logic (Plé and Chumpitaz Cáceres, 2010; Lintula *et al*, 2017), the potential negative outcomes of co-created value have not been addressed since they are rooted in G-D logic where the role of the customer is 'to "use up" or "destroy" value created by the firm' (Vargo *et al*, 2008:148). As enhancement in systemic well-being gained through the integration of operant resources and measured in terms of adaptability and survivability, the holistic approach to value co-creation support the optimistic view of S-D logic and value-related processes. Actually, value can be co-created or "co-destroyed" depending on interactions, misuse of resource and misalignment of processes within and between service systems, as for firm-firm and firm-customer relationships. For instance, Echeverri and Skålen (2011) provided evidences of value co-destruction emerging from the actors and activities misalignment in the public transport industry. Similarly, Neuhofer (2016:782-783) acknowledges that 'value might not be created but destroyed by the actors (e.g. the tourist) or the resources (e.g. ICTs) that are integrated in the process [that] might occur on a voluntary (intentional) or involuntary (accidental) level'. So, service provisioning cannot always result in positive value co-creation processes by excluding any devaluation practice, whether relevant to individuals or organisations. Further, service exchange and value co-creation can be asymmetric in terms of benefit for each actor involved in value-related processes. In fact, any service exchange is based on different access to information (information asymmetry), which is mostly in favour of companies rather than customers, resulting in an imbalance in power relationship (Peñaloza and Venkatesh, 2006).

Besides, 'value co-creation may appear to be symmetric in power [producer-consumer equivalence], but may be asymmetric in tasks, resources [e.g. Knowledge] and processes from each party' (Woodruff and Flint 2006; Rossi *et al*, 2015:4). At the same time, Hilton et al (2012) argue that value is a personal evaluative judgement and cannot be co-created because it is realised by actors as outcome of service co-creation through the modification of their own resources prior resource integration experiences. Clearly, the co-destruction of value and the distinct ontological perspective on value (subjective vs intersubjective) mark a significant difference between S-D logic and the Customer-Dominant logic, which

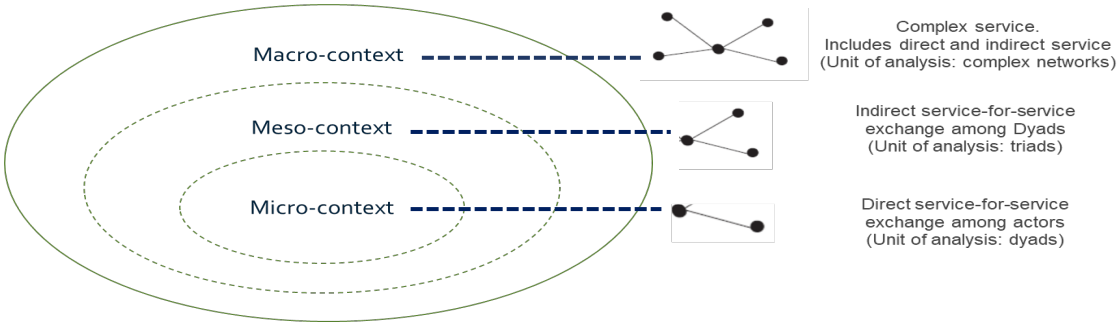
mostly relies on the subjective and experience-based view of use-value (Heinonen *et al*, 2013). Yet, S-D logic has been proposed as paradigm shift or a meta-theoretical framework to understand service-oriented marketing and society through a broad approach to value creation. By focusing on its intersubjective and phenomenological nature (co-creation), S-D logic have furthered the dynamic concept of value in use to lay the foundations for a "science" of service marketing (Woodruff and Gardial, 1996; Vargo *et al*, 2008; 2010a; Lemke *et al*, 2011; Lusch and Vargo, 2014a), without discarding the utility approach (i.e. use-value) of classical economics (Vargo and Morgan, 2005; Wooliscroft, 2008).

In recent advancements of S-D logic, the *value in context* concept has been introduced to extend the notion of value in use to the context in which service-for-service exchanges as well as resources integration are performed for mutual and reciprocal benefit (Vargo and Lusch, 2008b; 2017; Chandler and Vargo, 2011). Extending the locus of use-value to the context means emphasising the importance of processes that integrate resources for value creation, rather than units of output, and thereby furthering the distance from G-D logic. In line with the contextual nature of value creation (FP11 in Table 4), all actors involved in economic exchange perform resource integrating activities/processes (FP9) that cannot be alienated from value co-creation experiences (FP6, FP10). Drawing on the social network perspective and the fundamental strategic management theories (Penrose, 1959; Barney, 1991; Pattison and Robins, 2002), Chandler and Vargo (2011:44) state that 'every actor itself integrates resources through service-for-service exchanges with other actors [thus] the value creation space extends well beyond direct actor-to-actor exchanges (i.e. Firm–firm interactions or firm–customer interactions)'.

Exchange processes and links between actors and constitutes markets transcending space and time, while 'practices and transformations are temporal replications of rules, or institutions that facilitate exchange processes' (Chandler and Vargo, 2011:45). Thus, value co-creation is context dependent. In other words, the context is a fundamental dimension of value creation framing resources, services, and markets at different levels (Figure 12). Even if the notion of context drawn from the social networks analysis presents limitations pertaining its application to the general perspective of service networks (Chandler and Vargo, 2011; Löbler, 2013), the value in use/value in context is consistent with the service systems and service ecosystems conceptualisation supported by both S-D logic and Service Science (Maglio *et al*, 2009; Vargo and Lusch, 2011; Lusch and Vargo, 2014a). Provided that

service ecosystems are a combination of information, people, technology (i.e. resources) connected one another through value propositions (Spohrer *et al*, 2008b), any system can use its own resources and acquire resources by exchanging and applying other systems' operant resources (e.g. knowledge and technology) for mutual beneficial purposes to co-create value (Lusch and Nambisan, 2015).

Figure 12. Levels of context framing service exchange

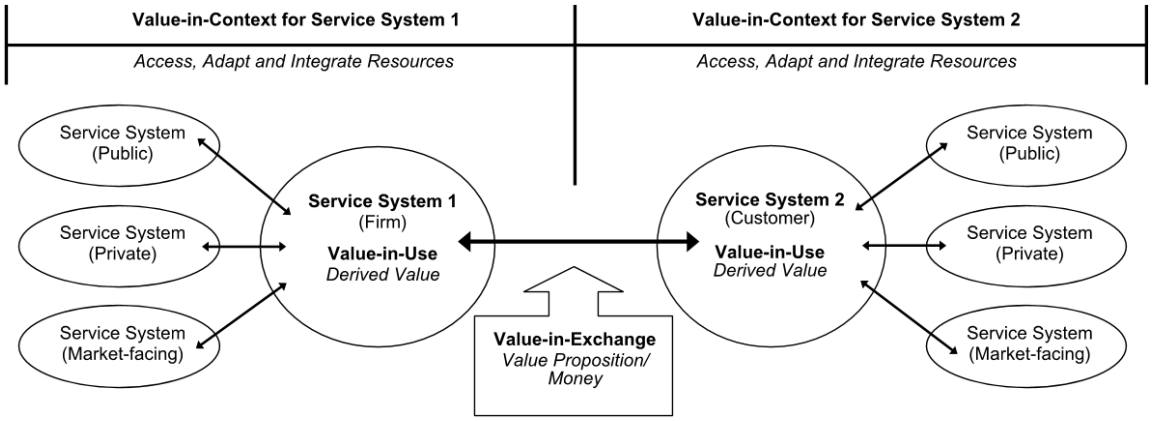


(Adapted from Chandler and Vargo, 2011:42-43)

Individuals, organisations, cities, city departments, government agencies or even nations can essentially be recognised as actors or service systems 'effectively depending on the resources of others to survive [when they cannot be attained naturally]' and service exchanges as means to access them (Maglio and Spohrer, 2008; Vargo *et al*, 2008:149; Wieland *et al*, 2012). As illustrated in Figure 13, service systems are connected by value propositions that can be accepted, rejected or unnoticed by other systems on the ground of resources needed to exchange service and create value, which is, therefore, derived and determined from the context. Service ecosystems embody complex and dynamic contexts framing reciprocal service provision, interactions and networked relationships between socio-economic and technological actors aiming at the use and/or integration of resources to co-create value. Within such an ecosystemic view, value cannot be simply recognised as an individualised perception independent of the social context in which co-creation takes place. Thus, value in use or *value in context* extends further beyond the subjective setting of customers and providers to address the impact of socio-technological structures and forces on service ecosystems and value co-creation. By drawing upon social construction theories (Berger and Luckmann, 1991), Edvardsson *et al* (2011:334) contend that 'value-in-context should be understood as value-in-*social*-context' to recognise the 'major impact of social forces [and structures] on value cocreation, and on how value is defined and

perceived'. As Edvardsson and Tronvoll (2011:293) recall, 'the structuration theory posits social life as being shaped by social forces above the individual actors' embedded in social structures as shared values, norms and rules more than random individual acts.'

Figure 13. Value co-creation among service systems

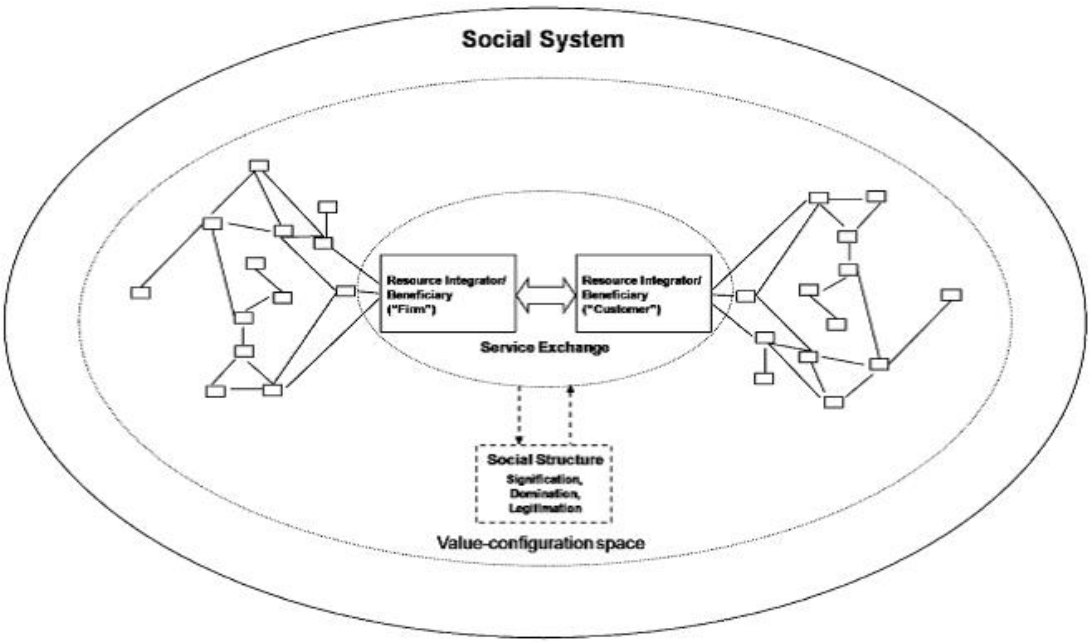


(Vargo *et al*, 2008:149).

Structures and knowledgeable people, who know what to do and how to do it, are linked and influence one another through the enactment of practices, or better routine actions. Value co-creation takes place in social systems and follows social structures reproduced by actors (companies and customers) embracing roles and positions according to different rules and resources within the service systems (Edvardsson *et al*, 2011; Akaka and Parry, 2018). Broadly, the mechanism of value co-creation has been amplified by incorporating Giddens' (1984) definition of social structures including (rules and resources) and social systems. These structured systems are reproduced by individuals interpreting the meaning of communication (signification), exercising power in the unequal distribution of resources (domination) and following norms and values to evaluate the other people's behaviour (legitimation) (Figure 14). Some scholars have adopted the structuration theory (Giddens, 1984; Sewell, 1992) to study the reproduction or (re)formation of service systems as the combination of social systems and structures (e.g. Vargo and Akaka, 2012). This helps to understand the influence of the duality of service ecosystem structures on the *value in context* and value creation (Edvardsson and Tronvoll, 2011) as expansion of S-D logic and Service Science by recognising the role of institutions (structures) in service ecosystems (Vargo and Lusch, 2016; Akaka *et al*, 2019). Other scholars (Akaka and Vargo, 2014; Vargo *et al*, 2015) refer to Orlikowski's (1992) structuration model of technology to understand

the meaningful connection between technology, institutions, and resource integration in service ecosystems (Figure 15). The literature on the social implications of S-D logic and Service Science appears to be still limited because research has focused mostly on value co-creation between customers and providers (Pels *et al*, 2009; Rihova *et al*, 2015; Buonincontri and Micera, 2016).

Figure 14. Expansion of S-D logic: social structure and service/social systems

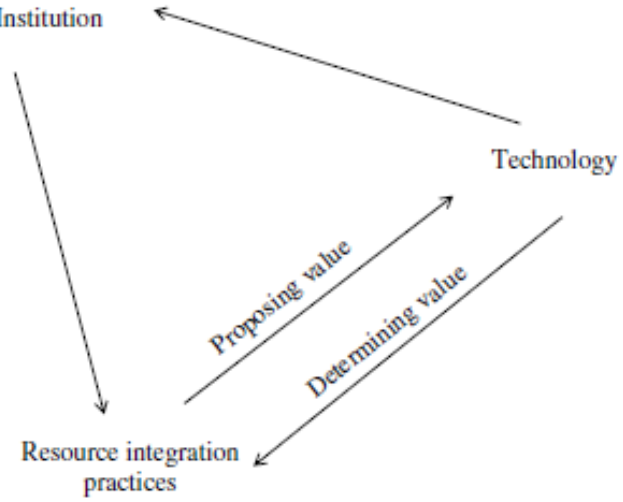


(Edvardsson *et al*, 2011:333).

As a result, the majority of extant works in this area tend to focus on structuration theory as a suitable approach to explore and examine value co-creation within the combined service and social setting. From this perspective, several key aspects need to be considered in understanding the value-in-social-context. First, the duality of structures and service systems and their interdependent relationship. Edvardsson and Tronvoll (2011:296) suggest that 'value co-creation is driven by the duality of service structures which include both the service schemas (value, norms and rules) and a constellation of resources available for the involved actors.' Similarly, Vargo and Akaka (2012:213) argue that 'social systems (e.g. service systems) are composed of structures (rules and resources) and systems (reproduced relationships)', which are entwined and reproduced by value co-creation and resource integration practices. Second, the significant relationship between institutions and practices. 'Practices, as a means for cocreating value', and institutions (structures) mutually influence one another, as much as their relationships (systems)

(Vargo and Akaka, 2012:212). In service systems, 'institutions (i.e. rules, norms, meanings, practices and similar aides to collaboration)' and 'institutional arrangements' (i.e. interdependent assemblages of institutions) are recognised as enablers of value creation practices (Vargo and Lusch, 2016:6). Third, service ecosystems are recognised as complex and dynamic social context in which technology (as operand and operant resource) and its relationship with institutions play a major role (Letaifa *et al*, 2016; Barile *et al*, 2017; Akaka *et al*, 2019).

Figure 15. Structuration in Service (Eco)Systems



(Orlikowski, 1992; Vargo and Akaka, 2012:214).

Finally, the emphasis on structuration and the social context framing value co-creation and resource integration aligns with both S-D logic and Service Science but can also be seen as consistent with the emerging conceptualisation of smart tourism ecosystems. To date, this specific domain of research remains limited in respect of the value created in any socio-technological context.

3.3 Value creation in smart tourism ecosystems

With interest in the value creating potential within a complex and heterogeneous service context characterised by synergic activities, the application of S-D logic to tourism have recently emerged in a limited body of literature. Li and Petrick (2008), for instance, argue about the relevance of S-D logic to tourism marketing and the lack of in-depth conceptual exploration in the light of a paradigm shift in service marketing. Fitzpatrick *et al* (2013) and

Line and Runyan (2013) focus on the integration of value creating assets to co-create value in the context of the hotel industry and destination marketing, respectively. Park and Vargo (2012) suggest that S-D logic can provide a significant basis to developing tourism marketing strategy in such an ever-changing market context, while Warnaby (2009) and Eletxigerra *et al* (2018) apply the same logic to broaden the scope of place and destination marketing. Others (Shaw *et al*, 2011; Cabiddu *et al*, 2013; Neuhofer, 2016) address value co-creation management in different context, with reference to tourists' own experience. Furthermore, several scholars have recently recognised S-D logic as a suitable meta-theory to address value co-creation processes in smart tourism destinations and its implications for competitive advantage (Wang *et al*, 2013; Gretzel *et al*, 2015a; Boes *et al*, 2016; Barile *et al*, 2017). Given the shared view on value, service systems and technology (Lusch *et al*, 2008; Akaka *et al*, 2019), Service Science and open innovation can also provide theoretical underpinnings to understand value creation within smart tourism ecosystem (Alcoba *et al*, 2015; Gretzel *et al*, 2015a; Polese *et al*, 2018). As discussed in Section 2.2.1, smart tourism destinations can be seen as the socio-technological context within which value co-creation occur through service exchanges, resource integration (e.g. data, knowledge and ICTs) as well as networked interactions between all actors (or systems) involved in the process. Therefore, the logical connection of S-D logic and Service Science is clear when associated with value creation in smart tourism ecosystems.

This holds particularly true in relation to the 'holistic, dynamic and realistic approach to value creation […] among wider, more comprehensive configuration of actors', rather than its multidimensional nature and the firm-customer view (Vargo and Lusch, 2016:5; Akaka and Parry, 2018). In the context of this study, it means that the conceptualisation of value creation processes in smart tourism ecosystems can provide an in-depth investigation of determinant(s) of value creation and competitive advantage, such as knowledge. As such, this approach to value creation entails a shift 'from *production to utilization*, from *product to process*, from *transaction to relationship* [which] enhances our sensitivity to the complexity of roles and actor systems' (Vargo *et al*, 2008:151; Norman, 2001:87). The value creation process induced by the integration of knowledge-based practices and activities underpinning service exchanges is the phenomenon of interest to this research, not the nature of value in itself. Yet, the concept of value in tourism marketing and management has been often investigated by grouping the different dimensions of value throughout the

provision-perception continuum (Hayslip *et al*, 2013). For example, the concept of value has been examined as hedonic and utilitarian (Hyan *et al*, 2011); functional (i.e. price/value ratio), emotional and social (Williams and Soutar, 2009); transaction and acquisition (Al-Sabbahy *et al*, 2004). The relevant relationship between tourism experiences, perceived value, and tourists' behavioural intentions (as for purchasing and visit or revisit intentions), has guided the majority of studies on value in tourism marketing. In fact, perceived value is frequently examined in association with the customers' satisfaction, service quality and loyalty (Gallarza and Saura, 2006; Lin *et al*, 2017). This emphasis on subjective dimensions have produced a great deal of empirical studies on value in tourism from the consumer perspective within different areas of service (Table 8).

Table 8. Empirical works on value in tourism

Areas of Service	Perspective	
	Provider	Consumer
Destinations	Flagestad and Hope, 2001; Lemmetyinen, 2010; Melis *et al*, 2015	Crick-Furman and Prentice, 2000; Babin and Kim, 2001; Petrick and Backman, 2002; Sánchez *et al*, 2006; Um *et al*, 2006; Chen, 2007; Chen and Tsai, 2007; Lee *et al*, 2007; Gallarza and Gil, 2006, 2008; Buonincontri *et al*, 2017
Hotels/Resorts	Trivedi *et al*, 2008; Nasution and Mavondo, 2008; Cabiddu *et al*, 2010; Della Corte and Micera, 2011; Gallarza *et al*, 2018	Oh, 1999, 2003; Petrick, 2002b; Trivedi *et al*, 2008; Nasution and Mavondo, 2008; Wu and Liang, 2009; Navarro *et al*, 2013
Restaurants	Murphy and Smith, 2009; Lee *et al*, 2019; Sigala, 2019	Wu and Liang, 2009; Jensen and Hansen, 2007; Al-Sabbahy *et al*, 2004; Tam, 2000; Im and Qu, 2017;
Transportation (e.g. airlines & trains)	-	Park, 2007; Ho *et al*, 2010; Nunes *et al*, 2014; Dolan *et al*, 2019
Entertainment/Activities (e.g. Festivals)	-	Williams and Soutar, 2009; Hutchinson*et al*, 2009; Lee *et al*, 2007; Dumman and Mattila, 2005; Petrick, 2004, 2003, 2002a; Kim *et al*, 2011; Rihova *et al*, 2015

(Adapted from Hayslip *et al*, 2013:308-309).

Studies on value in tourist destinations have gained the largest interest among scholars, particularly from the consumer perspective. Since the field of destination marketing and management 'has been characterised by a fragmented applied research approach rather

than theory building' (Pike and Page, 2014:203), there is a clear disequilibrium between the two perspective that might lead to misinterpretation of the S-D logic and its adoption in tourism. In the light of the participatory and customer-oriented view of co-creation in association with the experiential nature of tourism services (Otto and Ritchie, 1996; Li *et al*, 2018), the majority of studies have focused on the co-creation of tourism experiences, with strong attention to tourism consumers or customers and limited on-site empirical investigations (Campos *et al*, 2018). In their systematic mapping of co-creation in tourism literature, however, Mohammadi *et al* (2020:332) have found that this growing field of research is quite recent and the 'co-creation context has not gained much attention [...] Although it is crucial to identify and enhance enablers (e.g. IT infrastructures and culture) and remove the obstacles to implement co-creation, they have gained less attention by researchers.' They have also identified the hospitality sector as the prominent dimension of interest for its entwined combination of production and consumption, along with the limited attention to virtual co-creation and the lack of studies addressing the co-creation process guidelines and systematic steps for its implementation (Appendix 1). This is also reflected in smart tourism and smart destinations extant literature addressing value and value co-creation.

As discovered by Mehraliyev *et al* (2020:81), 'the effects of smart tourism on suppliers has received minimal scholarly attention. The effects being investigated, such as performance, value creation, and supply chain, also have limited focus'. Such a lack of supplier-focused research can depend on studies focusing on the conceptualisation of smart destinations; the understanding of smart-technology enabled tourism experiences; and the adoption of meta-theories (S-D logic and Service Science), which are still strongly identified with the experiential customer-oriented approach to value co-creation (Vargo and Lusch, 2017). Although the application of S-D logic to smart tourism recognises the blurred distinction between tourist providers, intermediaries and customers (Vargo and Lusch, 2008a; Gretzel *et al*, 2015a; 2015b), empirical works tend to focus on tourists' experience and value co-creation through the use of smart ICTs to personalise services (Buhalis and Amaranggana, 2015; Buhalis and Foerste, 2015; Neuhofer *et al*, 2015; Choe and Fesenmaier, 2017). The engagement of tourists in the co-creation of value through smart technologies can result in an experience closer to customers' needs and eventually benefit all parties involved in the dialog. However, this interactive process has different implications depending on the

context and areas of services. Hotels and restaurants can create *value in context* through direct (actors as dyads) or indirect (actors as triads) service-for-service exchange (Chandler and Vargo, 2011; Del Vecchio *et al*, 2018). Tourists can book and experience a night at hotels or dinner at restaurants directly from providers (dyads) or through intermediaries, like booking.com and opentable.com, selling rooms and table online (Triads). The same applies to the hotels and restaurants suppliers across their value chain. Conversely, tourist destinations are characterised by a combination of actors, dyads and triads engaging in a 'synergy among multiple simultaneous direct and indirect service-for-service exchanges' underpinning the value co-creation (Chandler and Vargo, 2011:44). In this macro-context, value co-creation processes can be viewed from the direct (dyadic) perspective and from the service ecosystem perspective encompassing all levels as a meta layer. Tourists can individually benefit from hospitality services at a destination, but their overall experience as well as the smart destinations competitiveness depend on the capability to co-produce services, exchange service offerings and co-create value across multiple actors of the value network (Park and Vargo, 2012; Pellicano *et al*, 2018; Polese *et al*, 2018). Therefore, the interconnected nature of value creation requires 'a more network-oriented strategic approach in which all network partners gain benefits' (Evans, 2016:18). Any technological, economic and social actor of smart destinations proposing value to tourists can be seen as nodes of service value networks, rather than a single part of the traditional supply chain (Allee, 2003; Lusch e*t al*, 2010; Boes *et al*, 2016; Buhalis, 2019). The relationship between knowledge, data, information, and actors is key to the structural integrity of the network and to value co-creation. To propose value, organisations trying to meet changing tourists' needs use competences (knowledge and skills) and align them to the relationship with the customers (source of revenue) and the suppliers (source of resources input) through data and information sharing. Therefore, an effective systematic collaboration and cooperation among the different service systems of smart tourism destinations (i.e. tourism suppliers, intermediaries, residents, tourists) can facilitate resources integration to co-create value (Boes *et al*, 2015; Melis *et al*, 2015; Jovicic, 2019). Several scholars (Schaffers *et al*, 2011; Boes *et al*, 2015; Hoarau, 2016) refer to the open innovation ecosystems as enablers of knowledge transfer, interconnected relationships and data sharing in smart destinations. In this environment, value can be co-created through assets management, open access to tangible and intangible resources, collaboration among actors sharing data, information, and knowledge resources. Indeed, by providing physical and digital platforms supporting

open access and exchange of such key resources across actors, smart tourism destinations can facilitate the allocation and equal distribution of resources as well as collaboration to enhance the experience of tourists (Egger *et al*, 2016; Celdran-Bernabeu *et al*, 2018; Ahlers *et al*, 2019). However, this can raise issues mainly concerning competitiveness, destination marketing empowerment, firms' adaptation to the changing market structure and their dynamics in the business ecosystem. Scholars and practitioners (Reinhold *et al*, 2015:138) concur on the fact that 'destinations and their actors struggle to address the complexity of their business as their context changes' towards a smart tourism ecosystem within which predefined roles no longer apply to actors involved in the value creation process (Femenia-Serra *et al*, 2019). As a result, tourism organisations are required to be collaborative, agile and adaptive to survive within smart tourism ecosystems, because they cannot actually rely on their own resources and on conventional business models. Even if the adoption of open business models has been recognised as a suitable and viable option for value co-creation and innovation (Xiang *et al*, 2015; Gretzel and Scarpino-Johns, 2018), there is no agreed definition of smart tourism business models (Gretzel *et al*, 2015a). In this respect, the mere exchange of data and information within smart destinations does not necessarily imply an effective collaboration, because cooperation require sympathetic behaviour and exchanging information can be ascribed to the rituals, norms, and rules embedded in social systems (Beritelli, 2011). Therefore, value co-creation in smart tourism ecosystems should be understood in terms of interdependent relationships between economic, technological and social actors (service systems), social structures (norms, rules, beliefs and practices) as well as tangible and resources (Edvardsson and Tronvoll, 2011; Vargo and Lusch, 2016; Barile *et al*, 2017). In this complex and dynamic context, knowledge and skills play a pivotal role in understanding the co-creation of value from the strategic management viewpoint.

3.4 Chapter conclusions

The S-D logic and Service Science has helped in understanding the value creation process as a socio-technological phenomenon occurring in smart tourism ecosystems. The fact that value is co-created by integrating resources and exchanging services, through networked interactions between all actors involved, entails a structural view of the social, economic, and technological systems of tourist destinations. Even if such a systemic view appears to be more consistent with the Service Science perspective (Spohrer and Maglio, 2010b), the smart tourism ecosystems complexities can be better understood through the overarching

and integrated orientation of S-D logic (Gretzel *et al*, 2015b; Jovicic, 2019). For example, the transition from "value in use" to "value-in-social-context" provides the ground for the contextualisation of the value co-creation process in smart service ecosystems (Lusch and Vargo, 2014a; Polese *et al*, 2018). So, the complex networked and dynamic configuration of interactions between actors involved in the co-creation of value in smart destinations requires a systemic approach extending beyond the users-provider relationship. Despite being deemed as a viable approach to investigate value creation in tourism, the adoption of S-D logic in empirical smart tourism research appears to be limited and mainly focused on consumer/customer perspective (Hayslip *et al*, 2013; Mehraliyev *et al*, 2020). Similarly, the growing interest in the co-creation processes in the tourism domain has not been translated into an extensive body of knowledge that is largely characterised by a customer-oriented approach (Mohammadi *et al*, 2020). Hence, the adoption of a supply-side view by this research to reduce the gap in the extant literature, which have also been found in the view of knowledge as strategic source of competitive advantage and innovation from a socially based perspective when adopted for its integration or application for value co-creation in smart destinations.

Chapter 4. Strategic management perspective on value creation

Strategic management theories offer a meaningful perspective to address the co-creation of value in smart tourism ecosystems. Even if a limited number of studies have combined S-D logic and strategic management in tourism (Evans, 2016), common areas of research can be found to address value creation in smart destinations (Shaw *et al*, 2011; Vargo and Lusch, 2017). Co-creation, resource integration, service innovation and competitiveness are among them.

To understand value creation from the strategic management standpoint, it is crucial to identify the importance of resource integration (i.e. resourcing) in the value co-creation process. It is relevant, in fact, to acknowledge that effective resourcing can help in gaining competitive advantage. Within smart tourism ecosystems, all actors involved in value co-creation need to collaborate, interact and reconfigure resources for their integration. As such, it is key to identify the most significant resources in the operant-operand distinction suggested by S-D logic (Shaw *et al*, 2011). The application of knowledge is recognised as essential to an effective transformation and integration of potential valuable resources for the co-creation of value to trigger service innovation and achieve a competitive advantage against other destinations (Park and Vargo, 2012). While considering applied knowledge and skills as an operant resource, and in regard to the other components of smart tourism ecosystems (Section 2.3), the role of smart ICTs might raise some concerns pertaining the aforementioned operant-operand distinction (Akaka and Vargo, 2014; Troisi *et al*, 2019). Along with the definition of the Oxford Road Corridor as a smart tourism ecosystem, the concepts and gaps identified in the review of the smart tourism, S-D logic and strategic management literature are brought together to develop the procedural and structural tentative frameworks that will be presented at the end of this chapter.

4.1 Value creation through resource integration

The integration of resources can be considered as a crucial aspect of the value co-creation process within service ecosystems. Firms use their own resources and integrate other firms' resources or any resource available within the value network into processes and activities underpinning service exchanges and value creation (Norman, 2001; Lusch *et al*, 2010; Akaka and Parry, 2018). By doing so, organisations, as well as service ecosystems, can "learn", evolve, and adapt to the changing environment to gain competitive advantage

(Lusch *et al*, 2010; Lusch and Vargo, 2012b; Lim and Maglio, 2019). So, resource integration provides strong motivation for interaction, relationships and cooperation between service systems aiming at value creation. Gummesson and Mele (2010:183), for instance, point out that interaction (as for resource transfer and learning) and resource integration (as for complementarity, redundancy and mixing of resources) are 'interlinked steps in the value creation process within a network-based stakeholder perspective'. From the point of view of firms proposing and delivering value to customers, a supplier value chain is broadened into value networks to co-create value by reconfiguring resources, processes and activities. This is clearly coherent with the S-D logic proposition of all actors in service ecosystems as resource integrators (Vargo and Lusch, 2008a), the value constellation concept in place of value chain (Normann and Ramirez, 1993) and the value co-creation systems (Maglio and Spohrer, 2013). In conceptualising the subjective value realisation process in contrast to the value co-creation concept, Hilton *et al* (2012) contend that resource integration is essential to service co-creation and, ultimately, for value realisation. Alternatively, Peters *et al* (2014) address the objective, subjective and intersubjective theoretical orientations of the resource integration process. With the joint and shared purpose to create value, organisations endeavour to attain effective resource integration by matching internal and external resources, activities, and processes. Since new business model and new ideas are introduced by new actors entering the market network, the enactment of practices supporting a higher level of "configurational fit" increases the opportunities for value creation and service ecosystem stability (Storbacka and Nenonen, 2011). In S-D logic and Service Science, 'value creation occurs when a potential resource is turned into a specific benefit' for all actors involved in the process (Lusch *et al*, 2008:8). It is, therefore, crucial to recognise the most relevant resources and how resource integration drives value co-creation and competitive advantage in service ecosystems.

To co-create value through resource integration, S-D logic stresses the operant resources (those capable to act on all other resources) prominent role over operand resources (those that an operation or an act is taken upon to produce an effect, namely to be valuable) (Constantin and Lusch, 1994; Akaka and Vargo, 2014). This distinction can also be identified in terms of physical/tangible and intangible (e.g. human, organisational, informational and relational) resources (Madhavaram and Hunt, 2008), with knowledge and skills capabilities deemed as determinant of service innovation, value creation and competitive advantage

(Lusch *et al*, 2010; Lusch and Vargo, 2012b). Similarly, Service Science classifies resources in service systems according to the resources with rights, resources as property, physical entities and socially constructed resources (Akaka *et al*, 2019), which have been recognised as significant mechanism for value creation in service systems likewise operant resources (e.g. Spohrer and Maglio, 2010b). This aligns with the value-in-social-context concept and the role of institutions (i.e. symbols, norms, rules, meanings, practices) determined and defined by individual and social actions underpinning service exchanges and value creation in service ecosystems (Edvardsson *et al*, 2018). Therefore, institutions embody 'integrable resources that are continually assembled and reassembled [as institutional arrangements] to provide the structural properties we understand as social context and thus are fundamental to our understanding of value cocreation processes' (Vargo and Lusch, 2016:17).

However, some conceptual issues concerning operant-operand resources distinction and resource integration processes might arise from technology and information resources, particularly in socio-technological contexts (smart destinations). Understanding the nature and role of technology is crucial in the light of its importance in the conceptualisation of service systems and smart tourism as well as for being a key driver of innovation and value co-creation. Drawn upon Orlikowsky's (1992) structurational model of technology (Figure 15), the duality of technology as operant and operand resource raises questions about the operant-operand dichotomy (Akaka and Vargo, 2014). Since operant resources typically concern human capabilities, and operand resources are the outcome of human actions (Constantin and Lusch, 1994), it is hard to classify autonomous ICTs (e.g. the machine-to-machine systems without human intervention) as operant resources of service systems (Kleinaltenkamp *et al*, 2012; Maglio, 2017). Thus, there is no clear-cut distinction between operant and operant resources in relation to smart ICTs (Barile and Polese, 2010; Peñaloza and Mish, 2011). Campbell *et al* (2013), in particular, argue about a superordinate level of operant resources as 'bundles of basic resources' underestimates, or deny, the key role played by physical (operand) entities in establishing the type and quality of operant resources (Madhavaram and Hunt, 2008:68). Further, they have claimed that 'information is critically dependent on the [type and quality of the] material in which it is embedded' (Campbell *et al*, 2013:316). In contrast to this "embodied materiality of information", S-D logic refers to the increasing amount of information-based resources, their detachment

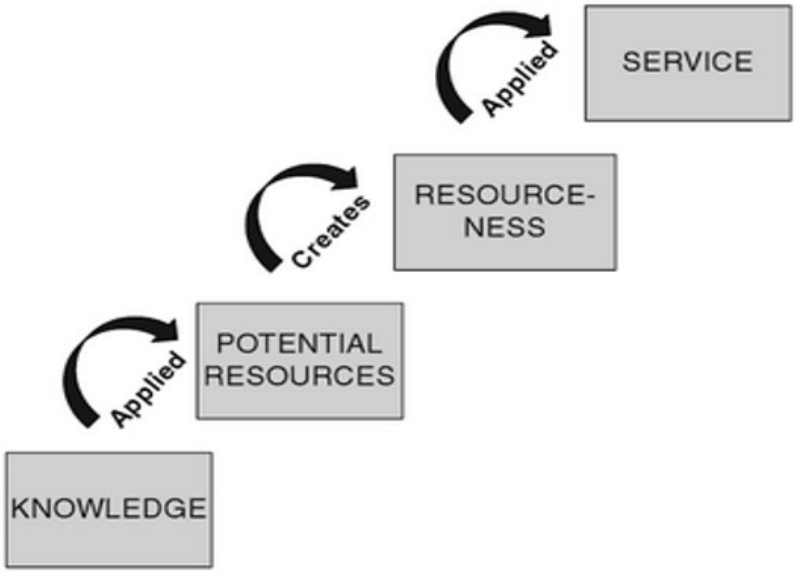
from its physical form and device (resource liquefaction) and the optimal combination of these resources across space, time and actors to create a competitive value proposition for customers (resource density) (Norman, 2001; Lusch *et al*, 2010). Hence, the focus on service innovation as 'rebundling of diverse resources to create novel value experiencing resources that are beneficial to some actors in a given context' (Lusch and Nambisan, 2015:161; Bifulco and Tregua, 2017). As digital structures facilitating the interactions of actors and exchange/combination of resources, the smart service platforms can increase resource liquefaction and enhance resource density (Lusch and Nambisan, 2015; Troisi *et al*, 2019). In fact, the more information resources liquefy the easier and cost-effective to (re)combine resources to increase density.

The increasing adoption of web-based business models provides the typical example of this phenomenon, with cloud computing offerings like SaaS (e.g. Salesforce) or PaaS (e.g. Amazon or Google) offering marketplaces where resources can be globally exchanged and integrated. If compelling value proposition is determined by enhancing resource density, then actors strive to mobilise, (re)configure and combine resources in the most effective way by integrating strategic resources, like knowledge, to let value emerge and innovate. Still, individual and collective capabilities and allowance to access and use resources are essential to resource integration as well as the major reason to enhance processes and collaboration among actors (Kleinaltenkamp *et al*, 2012). According to Lusch and Vargo (2014a:127), 'there are resources that are not exchanged in the market', public and private, 'in contrast with market-facing resources', which can be accessed by actors through the exchange of service rights. For instance, the data and information of visitors held by public sector bodies and private companies can be made available against cost price or published under different licences opposed to open data licences, which allow legal and technical open access to data. So, resources (tangible or intangible) can be potentially useful and integrated or entail resistance depending on the phenomenological and unique standpoint of an actor, its value appraisal and context of its application (Akaka and Vargo, 2014). With a clear distinction from the continuous creation, allocation and combination of resources of the Resource-Based View (RBV) (Mele and Della Corte, 2013), resource integration in S-D logic entails the capability of eliminating physical and, more often, intangible barriers (e.g. cultural resistance) as well as transform weaknesses into opportunities (Akaka *et al*, 2013; 2019). Accordingly, value creation in service ecosystems

requires the transformation of potential resources into resources for service exchanges ("resourceness") through the application of knowledge to appraise and overcome barriers or resistances (Lusch and Vargo, 2014b).

The "resourceness" process (Figure 16) can also be recognised as an essential precondition for resource integration, service innovation and competitiveness. Aligned with the idea of competing through service, rather than competing with services (Lusch *et al*, 2007), the use of knowledge to activate the potential of resources by integrating other resources, and to apply these resources to create services, can provide insights on service innovations and knowledge for competitiveness (e.g. Lusch and Vargo, 2014b).

Figure 16. Knowledge to create resourceness for service



(Lusch and Vargo, 2014b:123)

As uncertainty in knowledge management practices (Spender, 2007; 2008), for instance, resource scarcity can be seen as 'a function of actors knowledge of and skills in drawing on potential resources, often by integrating them to create new resources' to provide better services and compete (Lusch and Vargo, 2014a:120; Evans, 2016). This is clearly relevant in the smart service ecosystems of tourist destinations where static value propositions and value offerings do not allow competing and adapting to the ever-changing market context. Nevertheless, the primary source of competitive advantage is neither service *per se* nor service innovations, because they both 'depend upon the collection of competences [that

are] continually renewed, created, integrated and transformed' (Lusch *et al*, 2007:9). In agreement with Hunt's (2000) resource–advantage theory, S-D logic recognises superior competences (specialised knowledge and skills) as the source of sustainable competitive advantage (Lusch *et al*, 2007; Barile and Polese, 2010; Akaka *et al*, 2019). This perspective of knowledge as the main resource and source of competitive advantage entails a broader understanding of its implications than "simple" reference to competences, particularly in the light of the growing attention to socially constructed resources affecting value creation and service ecosystems.

4.2 Knowledge, innovation and value creation for competitive advantage

In strategic management and S-D logic literature, knowledge has been commonly regarded as the "true" source of sustained competitive advantage (Spender and Grant, 1996; Teece *et al*, 1997; Vargo and Lusch, 2008a; Evans, 2016). As difficult to obtain, imitate and/or duplicate by competitors, knowledge helps organisations to differentiate their offerings and gain competitive advantage over time (Barney, 1991; Grant, 1996). Yet, this advantage can only be maintained as long as they are able to develop knowledge to create and provide value or, in economic terms, to maintain above average profitability over time (Hill *et al*, 2014). Drawing on early recognition of the importance of knowledge to firms and the economy (Drucker, 1959; Penrose, 1959; Machlup, 1962), the competitive advantage and the strategic implications of knowledge have been delineated from different theoretical perspectives (Hoskisson *et al*, 1999). Table 9 shows the strategic management orientations in respect of the different locus of strategy. According to Porter's (1980; 1985) competitive positioning view, an organisation can gain competitive advantage depending on the ability to position itself in the market through (low) cost leadership and differentiation strategies. The increasing adoption of the Internet by firms have reduced distribution and promotion costs over time, with direct impact restricted on cost management across value chain and pricing strategies, while allowing differentiation in online and offline selling (Porter, 2001). This *generic strategy* can be sustained through effective and consistent configurations of interrelated value-adding activities throughout the value chain, including suppliers and customers, to create value for customers (Porter, 1985). These networked configurations allow knowledge and skills transfer among similar value chains and activities to enhance the potential for differentiation to gain competitive advantage (Porter, 1985), which can also be affected by knowledge spillover within specific geographical boundaries (Porter,

1998). With emphasis on external forces of competition (Porter, 1980; 1985; 2001), this outside-in view of strategy focuses on the internal and external activities analysis and processes fostering skills and expertise flows rather than the specific strategic role of knowledge. On the contrary, RBV perspective shifts the grounds of competitive advantage from value chain and competitive forces analysis to the application of Valuable, Rare, Inimitable, and Non-substitutable (VRIN) resources (Barney, 1991; 1995).

Table 9. Strategic management perspectives

	Strategy Perspective			
	Five Forces	**RBV**	**DC Approach**	**KBV**
Locus	External industry environment	Internal resource and capabilities		
Representative authors	Porter (1979, 1980)	Wernerfelt (1984); Barney (1991); Helfat and Peterag (2003)	Teece, Pisano and Shuen (1997)	Kogut and Zander (1992); nonaka (1994); Grant (1996); Spender (1996a); Zollo and Winter (2002)
Constructs/ attributes	Threat of new entrant. Bargaining power of suppliers. Threat of substitute products or services. Bargaining power of customers. Rivalry among existing firms	Bundles of firm-speecific valuable, rare, inimitable, and non-substitutable (VRIN) resources. Resources can be either tangible or intangible	Organisational processes (integration and reconfiguration, and learning) Specific asset positions (financial, technological and structural) Evolutionary path (historical constraints)	Individual experience. Organisational routines. Skilled actions. which together form organisational knowledge Two main types of knowledge: explicit and tacit knowledge
Disciplinary roots	Economics (Industrial Organisation)	Economics (Penrose, 1959), and strategic management	Economics (Penrose, 1959; Nelson and Wiinter, 1982); strategic management	Economics (Penrose, 1959), philosophy of science (Polanyi, 1966), learning theories

(Adapted from Grant, 2010:15)

With regard to the diversification between firms characterised by resources (Wernerfelt, 1984), this view, in line with the Ricardian argument, assumes that 'firms with superior resources [may] have lower average costs than other firm' (Peteraf, 1993:180). However, there is no direct relationship between superior resources, differentiation, and low-cost leadership. In practice, a sustained competitive advantage depends on the firm's ability to combine valuable resources and deploy 'a strategy not simultaneously being implemented by any current or potential competitors' (Barney, 1991:102). This aligns with the central concept of "core competency" and the resources-capabilities distinction of the inside-out

view of RBV and its further developments (Prahalad and Hamel, 1990; Teece *et al*, 1997). While resources are essentially defined according to their tangible and intangible nature, valuable use and possession/control (Wernerfelt, 1984; Barney, 1991; Grant, 1996), the application of resources determines organisational capabilities of the firm to coordinate, combine and integrate resources processes, activities, assets and functions to create an advantage (Teece *et al*, 1997). Core competences have been recognised as combinations of resources and capabilities developed over time to deliver additional value to customers through products/services (Prahalad and Hamel, 1990). Since resources change as a result of technological and product/service innovations and their use in value-creating processes, the application of learning and knowledge is essential to develop and maintain unique and difficult to imitate competences (Prahalad, 1993; Teece, 1998; Ardito *et al*, 2019a).

The association of knowledge and skills with competences, in S-D logic, rests on this vision of resources and capabilities (Lusch et al, 2007; Mele and Della Corte, 2013). This focus is reflected in the conceptual transition from the RBV to Dynamic Capabilities (DC) and the Knowledge-Based View (KBV) approaches (Hoskisson *et al*, 1999), with implications for knowledge as strategic source for value creation and competitive advantage (Schiuma *et al*, 2012). As extension of RBV, the idea of DC entails the firms' 'ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments' (Teece *et al*, 1997:516). According to RBV, these capabilities are interpreted as the exploration and exploitation of knowledge and competences in organisations, and available within the context in which they operate, which is often based on networked relationships. With reference to value capturing processes and intangible assets, Teece (1998:75) states that 'knowledge assets underpin competences, and competences in turn underpin the firm's product and service offerings to the market'. Alongside DC view, the RBV and KBV perspective recognise knowledge as the key driver of value creation and competitive advantage (Schiuma *et al*, 2012; Evans, 2016). Contrary to RBV and DC view of knowledge as generic resource (Barney, 1991; Teece *et al*, 1997), however, notable KBV scholars argue that knowledge and knowledge-based capabilities are the most important resources to achieve competitive advantage (e.g. Spender and Grant, 1996). But, the KBV 'is not a theory of the firm in any formal sense' (Grant, 2002:135) and its recognition as extension of any resource-based approach depends on the actualisation of knowledge 'as

a resource that can be acquired, transferred, or integrated to achieve sustained competitive advantage' (Eisenhardt and Santos, 2002:140).

Indeed, the notion of knowledge as "*justified true belief*" and the distinction between tacit and explicit knowledge have provided theoretical grounds for knowledge management models and approaches within the KBV domain (Baskerville and Dulipovici, 2006; Zehrer, 2011). Provided that tacit knowledge is subjectively held by individuals, intangible and difficult to express or extract in any form of communication (Kogut and Zander, 1992; Grant, 1996), organisations have to convert it into a codified and socially justified construct, or explicit knowledge, that can be easily managed (Nonaka and Toyama, 2003). This knowledge-creating process entails a final output (explicit knowledge) treated like any other physical or financial asset (Teece, 2003; Gourlay, 2006). Thus, the knowledge-based approach may seem aligned with the DC and RBV, particularly in terms of the knowledge assets superiority in dynamic environments. Conversely, the KBV and KM approaches are distinct from the resource-based perspectives (DC and RBV) in their questioning the logic of knowledge as commodity and organisations as its repository. The relationship between knowledge and learning can also gain different and enriched meanings in both S-D logic and strategic management theories. Since the S-D logic considers knowledge as the most important resource, rather than the unique source of competitive advantage and value creation (Vargo and Lusch, 2016), it could be argued that RBV and DC are more appropriate than KBV (Lusch and Vargo, 2014a). Yet, this may not hold true for several reasons linked to the recent S-D logic and Service Science conceptual developments towards a holistic view.

First, the value-in-social-context concept recognises the resources for value creation and service exchanges as social constructions (Chandler and Vargo, 2011; Edvardsson *et al*, 2018). Vargo *et al* (2010a:153) suggest that 'the ability to compete in the market is a function of both individual and collective (organizational) knowledge, and a firm's ability to contribute to value creation in the market also relies on the resources of customers and other external stakeholders (e.g. government entities).' In a similar way, several authors (Spender, 1996a; Cook and Brown, 1999; Brown and Duguid, 2001) have contended that KBV should be based on the social construction of knowledge based on social interactions and shared practices beyond firms' boundaries. Second, Service Science recognises the key role of socially constructed entities (firms and shared information) in value co-creation and

service innovation processes. As configurations of value propositions, technology, people and shared information, the 'service systems engage in knowledge-based interactions to co-create value (Maglio and Spohrer, 2008:19). This view aligns with the complex and dynamic mechanisms of service ecosystem formation and (re)formation within S-D logic (Vargo and Akaka, 2012). Third, the S-D logic view of firms as complex systems relying on learning to adapt to changing value network can arguably be more consistent with the social constructivist approaches to KBV and KM (Eisenhardt and Santos, 2002; Spender, 1996b; Lusch *et al*, 2010; Edvardsson *et al*, 2011; Hunter *et al*, 2015). Although knowledge has been commonly recognised as a result of organisational learning processes influencing future learning (Nonaka and Toyama, 2003; Crossan *et al*, 1999; Easterby-Smith and Lyles, 2011), the focus on knowledge as process (knowing) and inter-organisational knowledge-based practices neutralises the aforementioned difference and contributes to the definition of organisations as adaptive systems (Brown and Duguid, 2001; Chiva and Alegre, 2005; Spender, 2008). In other words, the knowing and learning processes across actors can allow better responses to people's needs and changing value networks. Finally, S-D logic and RBV are not highly interdependent because of the substantial conceptual differences (Table 10). Despite similarities concerning the role of actors/firms as value creators, the strategic resources as value enablers and the network of actors as the context (Mele and Della Corte, 2013), the majority of differences can be found in the emphasis on value co-creation (including customers, in contrast to RBV supplier-oriented perspective) and resource integration processes for competitive advantage (Lusch and Vargo, 2012b). Moreover, S-D logic has addressed knowledge and skills in a distinctive way than RBV and DCV. Even if there is a joint reference to intangibility and inimitability of knowledge as determinant to value creation and competitive advantage (Barney, 1991; Teece *et al*, 1997; Vargo and Lusch, 2017), the S-D logic acknowledgement of knowledge and skills takes place in service ecosystems characterised by institutions and collaboration between all actors involved in the co-creation of value (Madhavaram and Hunt, 2008; Vargo and Lusch, 2016; Akaka *et al*, 2019). Further, RBV has not considered the potential contribution of coopetition and knowledge spillover to value and competitive advantage (Kraaijenbrink *et al*, 2010). In turn, both DCV and KBV have stressed the role of knowledge assets and the conversion of tacit knowledge (individual and inimitable) to explicit knowledge (collective and manageable) (Polanyi, 1966; Nelson and Winter, 1982; Teece, 1998; 2003; Nonaka and Toyama, 2003).

Table 10. A comparison between RBV and S-D logic

Main topics	Resource-Based View (RBV)	Service-Dominant (S-D) logic
Focus (original)	Firm	Firm-customer
Focus (recent)	Firm/Networks	Actors/Networks/Markets
Period of early development	1980s	2000s
Logic	For the firm (competitive advantage)	For marketing and market (value creation)
Theoretical perspective	Normative	Mainly positive
Basic goals	Strategic analysis of competitive advantage, including reference to inter-firm relations (networks).	New perspective on value creation. Unified theory of market and marketing based on value and resources
Disciplinary background	Economics and strategic management, including transaction cost, agency theory and industrial organisations	Marketing. Main contributions from service management, relational marketing, RBV, Resource-Advantage theory, network theory, competence-based and Knowledge-based concepts
Key topics	Competitive advantage through strategic resources providing performance superiority. Resource possession, resource control and/or availability.	Service exchanges. Value co-creation. Resource integration for value co-creation. Actors as resource integrators in value networks. Capabilities and competences as key resources for value propositions.
Level/Unit of analysis	Firm, (strategic) network	Actor, dyad, network, service ecosystem, market. Process perspective
Role of resources		
Resources	Assets, capabilities, competence, organisational processes controlled or available to a firm	Service renders. Operant/Operand. Knowledge and skills. Resources are not, they become.
Resources' origin	The firm with its activities. External.	Individual
Resources' function	Basis of strategic activities and source of competitive advantage	Operant resources as source of competitive advantage and value creation
Main relational focus	B2B, B2C	B2C/C2B, B2B, A2A
Process	Continuous creation, allocation, combination	Resourcing: creation, integration, and resistance removal
Resources' main focus	Interaction	integration
Value		
Value determination	Exogenous (occurs in the marketplace) and depends on the ability to define strategic resources.	By users (value in use) and context (value-in-social-context)
Source of value	From increasing revenues and/or reduce costs.	Application of resources with potential value (the service they render)
Value creation	Not addressed as focal point	Application and integration of resources, including interaction.
Identification of value	After its creation for different stakeholders, but with main aim of generating competitive advantage for the firm.	Only by the beneficiary of service exchanges (user)

(Adapted from Mele and Della Corte, 2013:202-205)

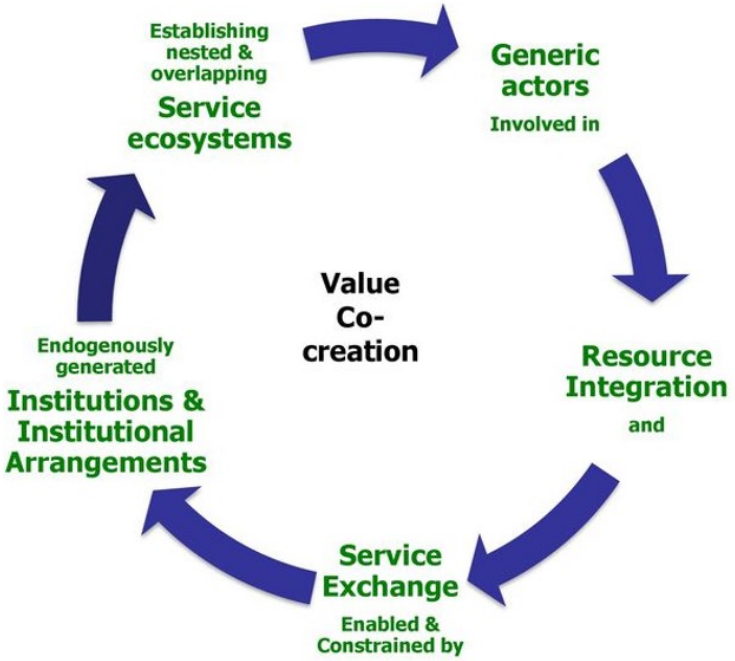
The extended thinking of RBV and their overlapping fields (i.e. knowledge infrastructure and learning for dynamic capabilities and KM as well as exploration vs exploitation) have

presented limitations and raised criticism through the lens of the recent S-D logic evolution (Easterby-Smith and Prieto, 2008). For instance, the popular and influential KM models are 'less a model or theory of knowledge creation through knowledge conversion, than one concerning managerial decision-making' (Gourlay, 2006:1430). Similarly, McAdam and McCreedy (1999) interpreted these models as a mechanistic categorisation of knowledge simplifying the tacit-explicit knowledge interactions, since the flow of knowledge from tacit to explicit is complex and not easy to be converted into new knowledge. The stress on the competitive advantage of the firm based on specialised individual (tacit) knowledge might also be questioned in terms of its transferability between companies. Employees and their activities can move to competitors or they can share their knowledge across firms (Spender, 1996b; Brown and Duguid, 2001). Such difficulties and limitations affect the capability of market actors to explore, exploit and modify resources over time as well as the ability to learn, evolve and adapt to changing market dynamics.

An incomplete or incorrect conversion of tacit knowledge and the consequent application in resourcing can accordingly affect value creation processes and sustained competitive advantage. Furthermore, exploration and exploitation of knowledge resulting in dynamic capabilities depends on the context in which they take place. In fact, such capabilities cannot be effectively used and deployed in 'high-velocity markets' and they may be shared across organisations, rather than being specific to a firm (Eisenhardt and Martin, 2000:1106; Easterby-Smith and Prieto, 2008). These issues seem to be crucial if associated to the S-D logic's focus on individuals and their social interactions for the application of operant resources (i.e. knowledge). They should be however addressed with reference to the duality of smart service ecosystems, technology and the definition of actors as operant resources embedded in social systems (Vargo and Akaka, 2012; Edvardsson and Tronvoll, 2018). Being conceptualised as resource integrators, all social and economic actors are capable of acting on other resources (operant and operand) through resourcing for value co-creation (Vargo and Lusch, 2004; 2011), rather than act as "*knowledge repositories*" (e.g. Penrose, 1959; Nelson and Winter, 1982). Furthermore, the emphasis on the role of institutions within the S-D logic narrative (Figure 17) is helpful to understand cooperation and coordination practices across actors of smart service ecosystems (Chandler and Vargo, 2011; Akaka and Vargo, 2012; Barile *et al*, 2017). Consistent with Simon's (1957) concept of "*bounded rationality*" adopted by KBV influential scholars (Grant, 1996; Spender, 2007;

2008), social norms, practices, symbols, beliefs and rules (institutions) 'enable actors to accomplish an ever-increasing level of service exchange and value cocreation under time and cognitive constraints' (Vargo and Lusch, 2016:11; Polese *et al*, 2018). The potential positive impact of collaboration and coordination on value co-creation clearly depends on the network effect prompted by actors sharing institutions, which can also hinder social and individual actions by encouraging routines, dogmas or ideologies embedded in the formation and re-formation of the smart service ecosystems socio-technical structures (Giddens, 1984; Akaka and Vargo, 2012; Barile *et al*, 2017). Hence, the distinct meaning and function of institutions from the traditional association with organisations rooted in neoclassical economics, and its prominence in marketing (Vargo and Lusch, 2016).

Figure 17. The narrative of S-D logic



(Vargo and Lusch, 2016:7)

This distinction between the cognitive-possession and the social-process perspective, and the stress on the latter, can be also found in integrative approaches to organisational knowledge and organisational learning (Chiva and Alegre, 2005). All things considered, the recent evolutions and extensions of S-D logic and Service Science suggest similarities and differences concerning KBV, particularly the socially based perspective towards knowledge as source of competitive advantage and the recent conceptualisation of service ecosystem (Brown and Duguid, 2001; Edvardsson *et al*, 2018). Also, the shared view of knowledge as

social construction, or objectified resource, aligns with the notion of service innovation as response to uncertainty and/or resources asymmetry to co-create value and gain strategic competitive advantage. As previously discussed in Section 3.2 and in this section, socially constructed resources have been recognised by Service Science as key to value creation as operant resources and institutions within S-D logic (Spohrer and Maglio, 2010b; Akaka and Vargo, 2014). With respect to the dynamic, interactive and situated social processes, at organisation or individual level, the notion of knowledge is implicit to S-D logic FP1 and FP4 premises and their most recent update (Ballantyne and Varey, 2006; Vargo and Lusch, 2008a; 2017).

Service innovation has been widely investigated by distinct fields of research, including economics (Gallouj and Savona, 2009), operations management (Oke, 2007), marketing (Nijssen *et al*, 2006), service management (Den Hertog *et al*, 2010), information systems (Nambisan, 2013) and strategy (Dörner *et al*, 2011). Several authors (Quinn *et al*, 1990; Hughes and Wood, 2000; Djellal and Gallouj, 2001) stressed the role of technology in enabling service innovation and the firms' "subordinated" use of advanced technical systems produced within the manufacturing industry. Yet, the widespread diffusion and adoption of advanced ICTs in service industries, including the so-called non-informational services (e.g. catering), has increasingly blurred the traditional product/service boundaries (Gallouj and Savona, 2009; Troisi *et al*, 2019). The extensive and pervasive application of smart ICTs to all processes and phases of innovation has been recognised fundamental to the evolution, efficiency and enhancement of services (Miles, 1993; Breidbach and Maglio, 2015). Given the progress of ICTs and the intangible nature of services, any new technology requires specific competences to be re-engineered and adapted for service innovation purposes.

Therefore, the rise of Knowledge-Intensive Business Services (KIBS) domain of expertise can be framed within this approach. Namely, KIBS experts provide operational support to organisations dealing with the deployment of advanced ICTs within knowledge-intensive service industries, like R&D services (Den Hertog, 2000; Miles, 2005). Such a technology-driven perspective on service innovations has been criticised for restricting the boundaries of both services and products innovation (Drejer, 2004; McFarlane and Söderström, 2017, West *et al*, 2018) and overlooking other forms of innovation like social innovations or marketing innovations (Sundbo *et al*, 2007; Rubalcaba *et al*, 2010; Polese *et al*, 2018). With

regard to product, process, market, input and organisational innovations, in fact, there is particular reference to the 'discontinuous emergence of new combinations [of resources] (innovations)' recognised as a viable driver for economic development (Drejer, 2004:556). By drawing on the re-conceptualisation of services, the customer-provider relationship and the key role of competences (knowledge and skills), S-D logic can be seen as a suitable service-centred view, 'consistent with the synthesis approach advocated for examining service innovation' (Ordanini and Parasuraman, 2011:5). Furthermore, in line with the neo-Schumpeterian approach, S-D logic and Service Science recognise that innovation concerns collective knowledge and the combination or integration of resources in new and better ways to co-create value (Spohrer and Maglio, 2008; Edvardsson and Tronvoll, 2013, Cook, 2018). The S-D logic overarching view of service innovation can be sustained by four interrelated dimensions encompassing differences and similarities in service ecosystems, innovation systems, resourcing, relationships, and ICTs (Table 11). To address service innovation as driver of competitive advantage, S-D logic provides a broad and overarching view than the integrative approach, which still entails some significant limitations. The institutional and loosely coupled innovation systems distinction keeps the difference between innovation in goods (institutional) and innovation in services (loosely coupled) (Sundbo and Gallouj, 2000; Coriat and Weinstein, 2002).

This classification restrains the evolutionary and dynamic notion of value creation as well as an expanded view of technology in service innovation (Akaka and Vargo, 2012; Lusch and Nambisan, 2015). Actually, the integrative models and taxonomies transcending goods and service innovation boundaries do not explore how structures co-exists and systems interact (Gallouj and Savona, 2009), even if the systemic analysis of networks of firms and non-technological innovations are considered (e.g. Sundbo *et al*, 2007). Both perspectives recognise innovation as a process that is not limited to new tangible or intangible products. Yet, the integrative approach further the traditional Schumpeterian view by distinguishing between specific areas of innovation, like product, process, and organisational innovations (Drejer, 2004), S-D logic suggest a comprehensive view of service innovation (Ordanini and Parasuraman, 2011). Therefore, S-D logic 'autonomous conceptualization of service as a co-produced process that involves the application of competences' concerns 'how firms can better serve' (Vargo and Lusch, 2008a:5; Ordanini and Parasuraman, 2011:5). This is consistent with the competing *through* service and competing *with* services distinction

(Lusch *et al*, 2007). Service innovation can be directly related to service enhancement, value co-creation and knowledge. S-D logic and Service Science suggest that service 'innovation is driven by the co-creation of value and unique perspectives of how to apply and integrate resources' within and among service systems (Akaka and Vargo, 2014:381).

Table 11. Service innovation key dimensions in S-D logic and integrative perspectives

Key dimensions	Perspectives	
	Integrative approach	S-D logic / Service Science
Innovation Systems - Service ecosystem	Nelson, 1993; Andersen *et al*, 2000; Metcalfe and Miles, 2000; Sundbo and Gallouj, 2000; Coriat and Weinstein, 2002;	Spohrer and Maglio, 2008; Edvardsson and Tronvoll, 2011; Vargo and Lusch, 2011; Vargo and Akaka, 2012; Vargo *et al*, 2008; 2015.
	Service ecosystems and ***innovation systems*** concepts present similarities in the identification of a context that frames service innovation processes and conceptual differences in the definition of such context	
Resources - Resourcing	Froehle and Roth, 2007; Gallouj and Savona, 2009; Den Hertog *et al*, 2010	Lusch *et al*, 2007; 2008; Vargo *et al*, 2010b; Lusch and Vargo, 2014b
	Resourcing activities require new and different combinations of internal and external resources to foster innovation processes. The combination of resource-oriented practices (intellectual, organisational, and physical resources) and process-oriented practices can enhance service development capabilities. This has implications for resource integration, actors' relationships, and competitiveness	
Relationships	Gallouj and Weinstein, 1997; Djellal and Gallouj, 2001; Magnusson *et al*, 2003; Drejer, 2004; Hipp and Grupp, 2005; Von Hippel, 2005; Alam, 2006	Lusch *et al*, 2007; Spohrer and Maglio, 2008; Ordanini and Parasuraman, 2011; Maglio and Spohrer, 2013; Vargo *et al*, 2015
	Relationships within service systems/innovation systems support interactions, collaboration and cooperation practices among actors involved in resourcing for value co-creation and service innovation. These practices are strongly interrelated to learning, knowledge and competences. Customer involvement in innovation processes, open innovation, and external relationships (suppliers and other stakeholders) characterise the integrated approach, likewise S-D logic, and Service Science.	
Technology	Gallouj and Weinstein, 1997; Gallouj, 2000; Djellal and Gallouj, 2001; Tether, 2005; Sundbo *et al*, 2007; Rubalcaba *et al*, 2010	Maglio and Spohrer, 2008; Vargo and Akaka, 2012; Akaka and Vargo, 2014; Lusch and Nambisan, 2015
	Technology is not excluded from service innovation products and processes by both approaches. The adoption and use of technology are only part of the processes, even though a significant one, since non-technological and value co-creation have been recognised as crucial. S-D logic and Service Science rely on the duality of technology (operand/operant resource) to argue upon its use as operant resource in relation to service ecosystem institutions and practices. On the other hand, the integrative approach identifies dynamic combinations of interactions between competences (knowledge) and technology. including non-technical competences, such as managerial skills	
Knowledge (competences)	Gallouj and Weinstein, 1997; Sundbo, 1997; Gallouj, 2000; Nightingale, 2003; Drejer, 2004; Leiponen, 2005; De Vries, 2006	Ballantyne and Varey, 2006; Spohrer and Maglio, 2008; Lusch *et al*, 2007; 2010; Lusch and Vargo, 2012b

As a result, the value co-creation process can provide all actors involved with opportunities and/or capabilities to innovate their service offerings resulting in competitive advantage (Lusch et la, 2007; Vargo and Lusch, 2008a). Such opportunities and capabilities require iterative processes of collaboration, learning and the application of knowledge, as already

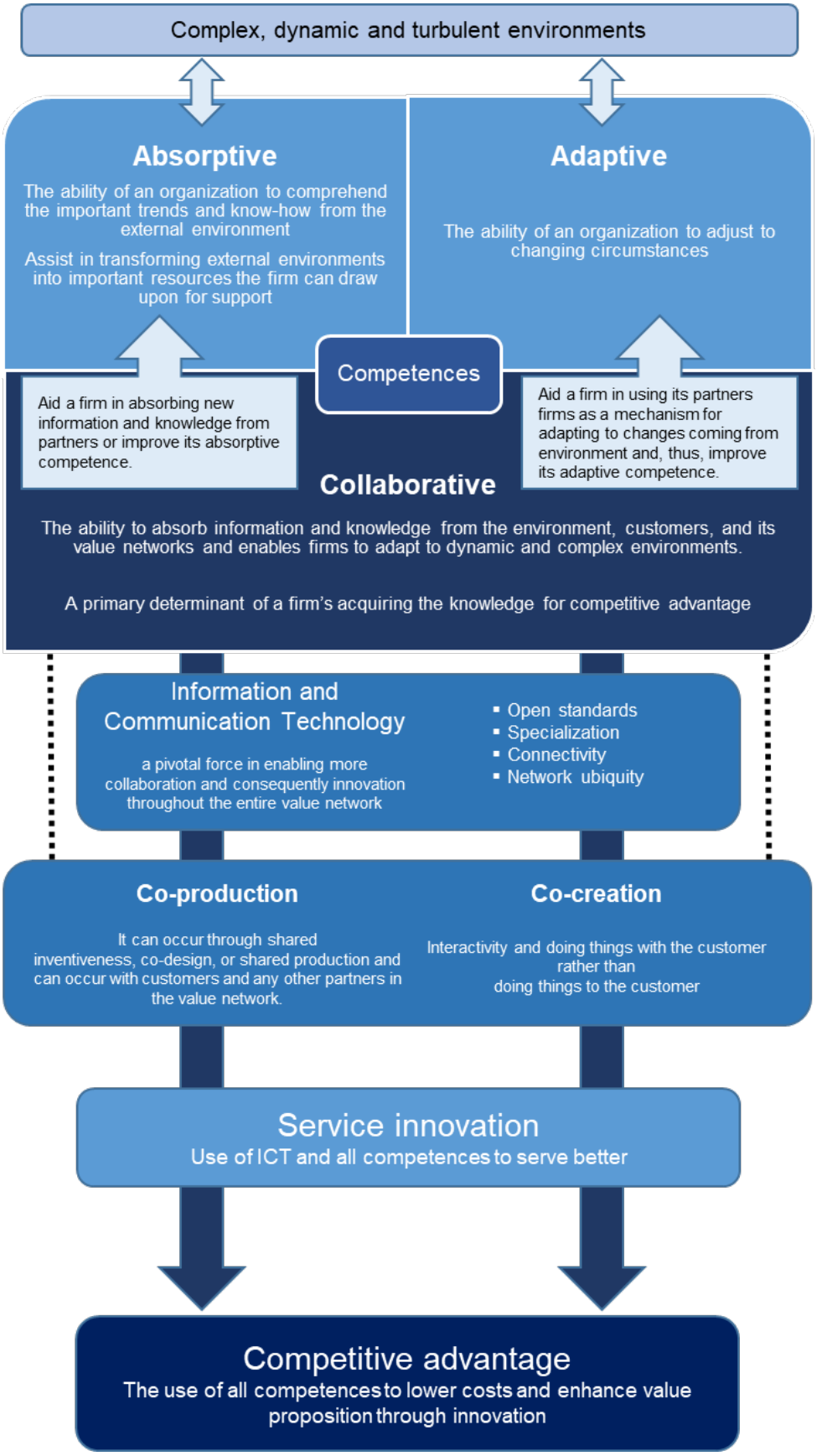
stated. Since the debate over the distinction between service and goods has become less relevant, all-encompassing views have shifted their focus on 'knowledge and practices' to manage resources for service innovation as means to achieve competitive advantage (Carlborg *et al*, 2014:384). Even though integrative approaches and S-D logic recognise the key role of knowledge in service innovation (Gallouj and Weinstein, 1997; Drejer, 2004; Leiponen, 2005; Lusch and Vargo, 2012b), the respective interpretation of such a strategic resource can be profoundly different in the light of the recent evolution of S-D logic and Service Science (Spohrer and Maglio, 2010b; Vargo and Lusch, 2011; 2016; 2017).

In stressing the importance of codified knowledge for service innovation, the integrative view does not consider the relational and institutional dimensions defining the context in which the innovation processes can take place (Gallouj and Weinstein, 1997; Drejer, 2004; Edvardsson and Tronvoll, 2011; 2013). Knowledge can be considered as the outcome of learning processes affecting and being affected by innovation (Cohen and Levinthal, 1990). Even if this is specific to 'ad hoc innovations' (i.e. specific new solutions) or 'formalisation innovations' (i.e. better ordering of service characteristics) (Drejer, 2004 Leiponen, 2005), the use of objectified knowledge might risk neglecting the complex and dynamic attributes of organisational knowledge and learning (Brown and Duguid, 1991; 2001; Spender, 2008). In the use of Nonaka's (1994) theory of knowledge creation for service innovation, there is also a strong correlation with the technological and service-oriented approach of KIBS (Den Hertog, 2000; Gallouj, 2002; Leiponen, 2005; Gallouj and Savona, 2009). In S-D logic, knowledge has been expressed in terms of the application of specialised competences and capabilities to value creation and innovation processes (Lusch *et al*, 2007; Ordanini and Parasuraman, 2011) embedded in social, economic and technological systems (Edvardsson and Tronvoll, 2013; Lusch and Nambisan, 2015). With respect to competences (knowledge and skills) within a service ecosystem context, Figure 18 illustrates the service innovation process for competitive advantage. Nevertheless, this knowledge and its relationship with learning is not different from the one used by the integrative approaches and possibly in contrast to the recent conceptualisation of the service innovation context. As the outcome of 'learning processes of and within organisations' involving users and underpinning adaptive and absorptive competences (Easterby-Smith and Lyles, 2003:9; Ballantyne and Varey, 2006; Payne *et al*, 2008; Lusch *et al*, 2010), new services and or existing services enhancements rely on the creation, renewal and integration of data, information and

knowledge. Hence, the emphasis on knowledge integration and the knowledge transfer mechanisms, like knowledge brokering (Hargadon, 2002), for their capability to activate innovation by enhancing resource density and the tacit to explicit knowledge conversion (Ordanini and Parasuraman, 2011; Lusch and Nambisan, 2015). This view of KM practices stems from ICTs, system design and the assumption that identification, collection, storage, optimisation and delivery of organisational knowledge assets (mainly intellectual capital) facilitate their transformation into economic value (Teece, 1998; Alavi and Tiwana, 2003; Abualoush *et al,* 2018). Knowledge management studies built on the notion of knowledge as a "*commodity*" have been largely nurtured by the pervasive role of ICTs in organisational practices and the importance of relational skills based on the large amount of data and information (Lloria, 2008; Easterby-Smith and Lyles, 2011).

Clearly, the goal of organisational knowledge is to ensure effective performance within a competitive environment, rather than finding the truth (Demarest, 1997), which explains the extensive reliance on interrelated distinctions between know-how (tacit knowledge) and know-that (explicit knowledge) contended by Ryle (1949) and Polanyi (1966). Firms and users' competences and capabilities are grounded in this bi-dimensional nature of knowledge, since knowing rules or norms (know-that) does not necessarily mean how to apply them (know-how). Being able to play chess effectively (know-how), in Ryle's (1948) example, is not a direct consequence of learning all the rules (know-that). This process, or any similar one, requires 'practical knowledge' binding the two forms of knowledge (Brown and Duguid, 1991; 2001:204; Lave and Wenger, 1991), since they are highly entangled. Even if the knowledge emerging from the tacit-explicit conversion has been recognised as hardly "tradable" (Cook and Brown 1999; Gourlay, 2006), particularly across firms (Tsoukas and Vladimirou, 2001), the arguments against explicit knowledge as the only moveable knowledge have fuelled the codification of un-codified and subjective knowledge to make it manageable (Ryle, 1949; Boisot, 1998). However, the use of socially-based practices to overcome knowledge 'stickiness' and facilitate 'leakiness' does not overrule the tacit dimension, or its distinction with the explicit knowledge (Brown and Duguid, 2001:205), in tune with the notion of market as practices (Kjellberg and Helgesson, 2007; Andersson *et al*, 2008). The integration of resources in S-D logic, for instance, concerns the application of knowledge and skills in a specific context, with a specific purpose and through individual or organisational practices, rather than the knowledge resource in itself.

Figure 18. Service innovation and competitive advantage in S-D logic



(Adapted from Lusch *et al*, 2007)

By describing 'operant resources [mainly knowledge and skills] as bound to individuals' (Mele and Della Corte, 2013:203), S-D logic emphasises situated relational competences for resourcing (Vargo *et al*, 2010a). Considering that the application of core competences is essential to the co-creation of value, innovation and competitiveness (Lusch *et al*, 2007), knowledge should be considered in terms of socially-based practices situated in service ecosystems and influenced by asymmetry and uncertainty (Lusch *et al*, 2010; Edvardsson *et al*, 2018). This perspective has significant implication on the emerging social dimension of value creation and service innovation. In view of the complexity of the socio-economic and technological context of service ecosystems, therefore, reducing both uncertainty and asymmetry in service ecosystems is essential to facilitate innovation and value creation.

Asymmetry

In smart service ecosystems, asymmetry mainly concerns the difference in availability and access to data and information (Kitchin and Moore-Cherry, 2020), with impact on service exchanges and value co-creation processes (Barile and Polese, 2010; Wieland *et al*, 2012). Tourism has long been recognised as a market characterized by asymmetric information (Smeral, 1993; Oukarfi and Sattar 2020). In the contexts where data and information are asymmetrically distributed, the actors involved in market-related practices face unequal power relationships that can easily result in opportunistic behaviour by suppliers. This may fuel scepticism in the exchange of services and compromise the logic of value co-creation (Williamson, 1973; Peñaloza and Venkatesh, 2006). By recognising the strategic advantage of symmetric information (Lusch *et al*, 2006), S-D logic advocates the use of ICTs to liquefy information-based resources and improve their density (Normann, 2001; Lusch *et al*, 2010; Lusch and Nambisan, 2015). This orientation is coherent with the open innovation notion applied to services (Chesbrough, 2011), which pertains distributed innovations processes based on the management of knowledge flows beyond the firms' boundaries to enhance customers' value proposition (Chesbrough, 2013). Therefore, the need for open innovation entails that firms and customers face knowledge asymmetries, too. The Data-Information-Knowledge-Wisdom logical progression (Ackoff, 1989) failed in providing the theoretical support to the major KM issues (Spender, 2008), particularly the info-to-knowledge move (Weinberger, 2010). As such, the notion of knowledge asymmetry seems to be recognised mainly as an evolution of information asymmetry (Venzin *et al*, 1998) on the ground of its codification (i.e. explicit knowledge) as information (Lueg, 2001) and the problematic

nature of tacit knowledge (Tsoukas and Vladimirou, 2001). According to this cognitivist view, knowledge asymmetries 'would indeed be measurable in a positivistic, quantitative sense' (capacity of data/information resources), whilst from a constructivist perspective, 'knowledge and knowledge asymmetries are discursive constructions […] appreciated through human communicative interactions' (Kastberg, 2011:142-146). Considering that institutions embedded in the social system can play a crucial role in facilitating knowledge symmetry, the knowledge as practice view can also be applied to knowledge gaps between those individual(s) and/or organisation(s) "*who have*" and those "*who have not*" in service ecosystems. By following the value co-creation narrative, socially based practices across organisations and customers can reduce or neutralise hegemonic distinctions through the shared norms, values, symbols, and meanings fostered by social interactions. Hence, the stress on enhanced collaborative competency, in combination with all other competences (Lusch *et al*, 2007), and the recent move towards social construction theories application in S-D logic (Edvardsson *et al*, 2011).

Uncertainty

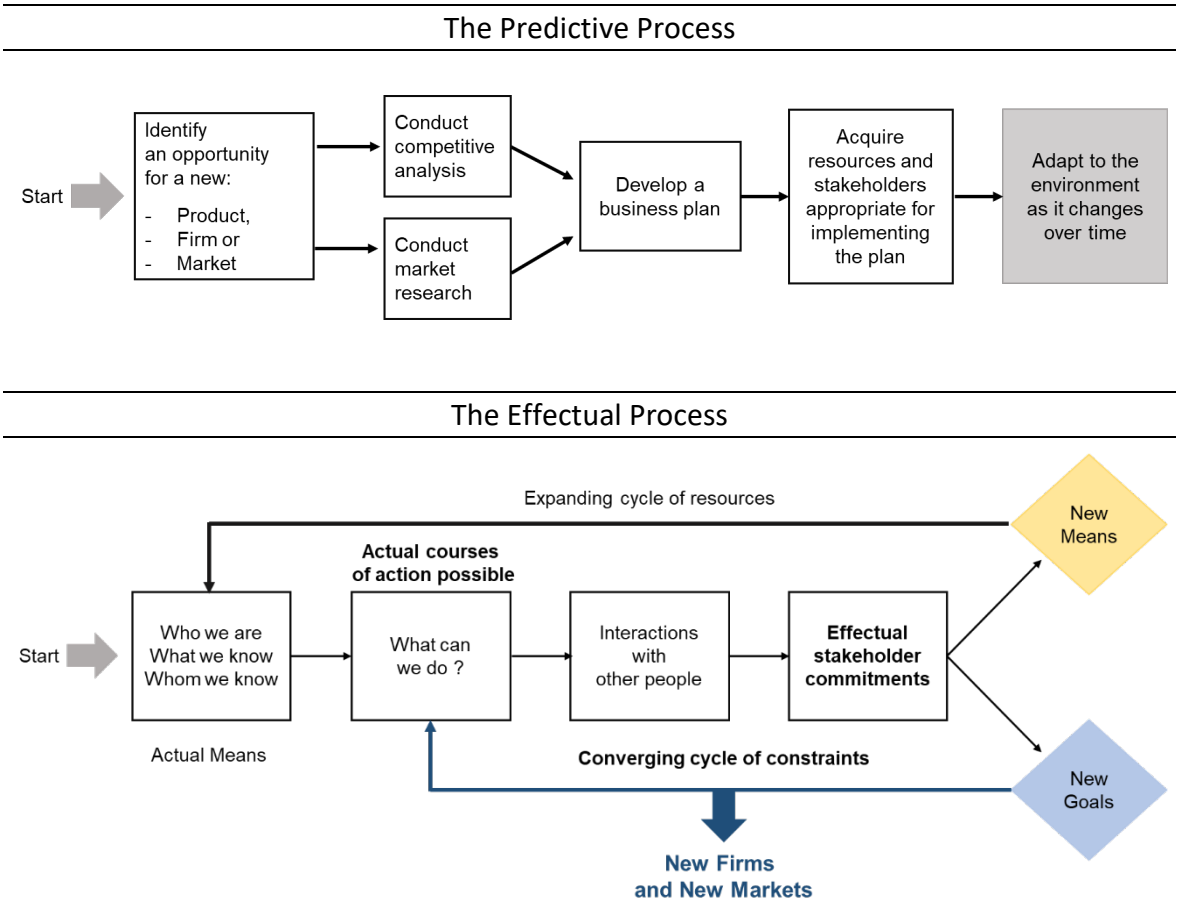
Uncertainty is a major attribute of today's complex marketing environment (Read *et al*, 2009). Market fragmentation, competitive forces and changing customers' needs or tastes are common driving forces of uncertainty. Actors make decisions and take actions 'under uncertainty as they adapt and learn and as they make adjustments to create or cocreate value' in a context characterised by multiple and overlapping structures (Vargo and Lusch, 2008a; Chandler and Vargo, 2011; Lusch and Nambisan, 2015:169). In turn, this continuous adaptation through learning increases the level of uncertainty for other actors and for the entire service ecosystem. Although shared institutions and institutional arrangements can limit such variability to an extent that facilitate predictability, value creation and decision-making under the 'S-D logic's system interactions still imply a high level of uncertainty' (Lusch and Vargo, 2014a:25-26). So, the inability to assess what is considered valuable in the future strongly affect markets and value, which are 'created more through innovation than invention' (Vargo and Lusch, 2014:245). To tackle this issue, the traditional market approach relies on causal reasoning based on the analysis of external inputs (e.g. market research), rather than non-predictive logic of effectual reasoning (Sarasvathy, 2001a; Read *et al*, 2009).

While the predictive process aims at adapting to changes in the business environment (e.g. competitive positioning and customers' needs/tastes) through analysis and planning, the effectual process identifies opportunities and new markets (means) as contingent to all stakeholders involved and their action (goals), without any predetermined set of goals or tools (Figure 19). Clearly, the effectual process suggests a creative approach to innovation consistent with dynamic and open ecosystems in which the predictive process can improve efficiency without creating distinctive value propositions to provide long-term strategic advantage (Taillard and Kastanakis, 2015). Nevertheless, the focus of predictive processes on the adaptation of *a priori* markets to the environment applies to 'highly institutionalized markets contingent on performativity' and often assisted by predictive analytics guiding marketing and financial strategies (Vargo and Lusch, 2014:243). This is essentially linked to well-defined roles, rules and norms of institutional markets reduce the level of uncertainty and foster the use of predictive analysis to improve performance.

Effectual approaches invert the predictive logic. Instead of relying on 'bounded rationality as a subset of predictive rationality', the effectuation theory turns managerial causal reasoning upside down to address decision issues in highly uncertain situations through entrepreneurial expertise (Sarasvathy, 2001a; Read *et al*, 2009:2). Effectual actors focus on actual means by answering to *what they are*, *what they know* and *whom they know* before deciding (*what they can do*) on resourcing and possible collaborations with other actors to co-create value in the dynamic, unforeseeable and constrained context that they experience (Sarasvathy, 2003; Sarasvathy *et al*, 2008; Vargo and Lusch, 2014). As this iterative process incrementally unfold over time, innovation (new firms and new markets) emerge from *new goals*, while *new means* (i.e. competences, abilities, and traits) provide resources for the actual means (Vargo, 2013). By doing so, actors continuously learn to integrate resources and cocreate value through their creative actions. The creative ability to integrate resources and co-create value enables competitive advantage and innovation (Im and Workman, 2004; Taillard and Kastanakis, 2015). Learning can facilitate actors' adaptation through iterative and constant adjustments of actions to the effects of (new) means (Sarasvathy *et al*, 2008; Read *et al*, 2009). As such, the negative impact of predictive approaches on adaptation, the learning in an uncertain and dynamic environment as well as the distinction between managerial and entrepreneurial decisions have been widely

recognised in literature (Mintzberg, 1990; Mosakowski, 1997; Sarasvathy, 2001b; Grant, 2003; Honig *et al*, 2005).

Figure 19. The predictive process and the effectual process of innovation



(Read *et al*, 2009:4; Vargo, 2013)

S-D logic and the effectuation theory present overlapping views in addressing uncertainty, service innovation, markets, and value co-creation (Lusch and Vargo, 2012a; Read and Sarasvathy, 2012). But, S-D logic seems to overlook much of the implication of knowledge-based practices by focusing more on learning and managerial-entrepreneurial dichotomy (Vargo, 2013; Vargo and Lusch, 2014). On one hand, knowledge has been implicitly seen as the outcome of adaptive learning processes, with potential misinterpretation of its use in relation to institutions (Lusch *et al*, 2010; Purvis and Purvis, 2012). On the other hand, the superordinate expertise of entrepreneurs over manager in facing uncertainty indicates an equivalent "classification" of knowledge mechanisms (Vargo and Lusch, 2014), which does not consider potential evolutions of KM in relation to organisational learning (Chiva and Alegre, 2005; Spender, 2008). Managerial decisions tend to rely more on predictive

information, like market analysis, than 'analogical reasoning based on experience' (Read *et al*, 2009:6). Hence, the positioning of managerial predictive reasoning in the G-D logic domain by S-D logic (Vargo and Lusch, 2014). In fact, entrepreneurs tend to rely on their ability to make strategic decisions by filtering and verifying information from external sources according to their experience before engaging in collaboration and commitment (Read and Sarasvathy, 2005). In line with effectuation theorists, S-D logic has advocated the iterative effectual process against the traditional managerial reasoning as an important premise for value co-creation and innovation (Lusch and Vargo, 2012a; 2014b). A similar critique to current managerial views has also emerged in the strategic management and knowledge management domain. The conventional idea that managerial knowledge is rooted in rational decision-making has fuelled the majority of knowledge management literature drawing on the efficiency of IT systems in managing information (Baskerville and Dulipovici, 2006). In contrast to such dominant approach, Spender (2007; 2008:165) has suggested the use of imagination to face uncertainty because 'knowledge management is about managing knowledge-absences rather than knowledge-assets'. Following Knight's (1965) definition of uncertainty as knowledge deficiencies holding back logical reasoning and Simon's (1991) bounded rationality, Spender (2008:171) sees collective knowledge-based practices 'as the interplay of imagination and experience' to overcome rational decision-making limitations in a move closer to learning processes.

Similarly, S-D logic identifies social institutions and practices as fundamental in value co-creation and innovation processes (Vargo and Akaka, 2012; Akaka *et al*, 2019). Creativity helps to enhance learning and competences, which are not given and constantly changing (Barrett, 1998; Tsoukas, 2009). People improvise new practices while constantly engaging in social practice to maintain their knowledgeability over time and context (Orlikowski, 2002). In his attempt to solve the intellectual/practical and rationality/creativity issues affecting decision-making under uncertainty, Spender (2007) translates the hierarchical data-information-knowledge logic into three different types of knowledge: knowledge-as-data, knowledge-as-meaning and knowledge-as-practice. Table 12 illustrates the detail of this knowledge-based theory concerning the data, meaning and practice of organisations. The separation of information from knowledge practices based on imagination helps to understand learning and managements' role differences. Managing 'what we have/know' requires the collection and analysis of data and information to support rational decisions,

while responding 'what we lack/do not know' entails the use of creativity in explorative practices to face uncertainties and overcome knowledge-absences (Spender, 2007:182; 2008:170). Several scholars (Cook and Brown, 1999; Lave and Wenger, 1991; Brown and Duguid, 1991; 2001) have similarly suggested socially based knowledge practice to move beyond current managerial approaches and towards situated learning processes.

Table 12. Extended scope of a K-based theory of organisations

Types of knowledge	Description	Managing what we have	Responding to what we lack
Knowledge-as-data	Competences to respond to data-absence and 'learning implies more data'	Rational decision making	Data collection and systematic discovery
Knowledge-as-meaning	Ability to 'connect the dots' in case of meaning-absence. Learning implies 'the acquisition of a framework of meaning or a change to one we already have in place'	Communicating meaning	Constructing meaning and heuristics
Knowledge-as-practice	explorative practices using creativity to overcome knowledge-absences	Executing decisions	Explorative practice

(Spender, 2007:183)

This view relies on the basic assumption that knowledge is a social phenomenon based on collective practices, rather than a cognitive process or an asset retained in individuals and organisations' boundaries (Cook and Brown, 1999). In service ecosystems, the knowledge mechanisms adopted by entrepreneurial experts concern the situated social practices embedded in institutions and, thereby, outside of the decision-makers' control (Brown and Duguid, 2001; Venkatesh *et al*, 2006; Read *et al*, 2009). In this environment, useful agentic knowledge can be easily developed by those who benefits from solutions that are often outside organisations' control (e.g. customers), rather than "experts" (Von Hippel, 1999; Brown and Duguid, 2001; Lusch and Vargo, 2014a). The S-D logic and effectuation theory contend that such knowledge can be developed through entrepreneurs' ability in engaging all stakeholders to co-create value and innovation (Read and Sarasvathy, 2012). Difficulties may arise, however, when an attempt to co-create value and develop innovation is made at a macro-context level of interactions, where effectual entrepreneurs expertise can be affected by multiple co-existing structures and systems (Chandler and Vargo, 2011; Vargo

and Lusch, 2016). In smart service ecosystems, uncertainty and unpredictability depends on different types of organisations, customers and competitors characterising the market environment as heterogeneous, complex, and dynamic (Lippman *et al*, 1991; Barile and Polese, 2010; Buonincontri and Micera, 2016). Effective entrepreneurial decision-making may vary according to the complexity of the context in which both 'predictive and effectual processes may be at work in tandem' (Read *et al*, 2009:4). Uncertainty and asymmetry cannot be isolated due to their mutual relationship. If actors find knowledge-absences in their context of action, they also face 'knowledge asymmetry between principal and agent' (Spender, 2008:169). Given the importance of information in both effectual processes and rational reasoning (Read *et al*, 2009), the identification of asymmetric information with knowledge asymmetry would imply an interpretation of knowledge incongruent with the role of institutions and the notion of value-in-social-context (Lusch *et al*, 2010; Edvardsson *et al*, 2011; Vargo and Lusch, 2016). This is mostly relevant in large and complex service ecosystem, like smart tourism destinations, where service innovation involves different stakeholders, advanced ICTs and intensive exchange of data and information.

4.3 Knowledge for value creation in smart destinations

The importance of knowledge in value creation and innovation processes has been widely recognised in tourism marketing and management literature. Hislop *et al* (1997) analysed the diffusion of knowledge and skills across networked organisations trying to innovate, with implications for competitive advantage. Hjalager (2002; 2010) assessed the pivotal use and creation of knowledge for innovation and the competitiveness of tourism firms and destinations. Shaw and Williams (2009) echoed Hjalager (2002; 2010) by addressing some specific components of KM and inter-organisational knowledge transfer in tourism, like communities of practice, knowledge overspill and collective learning. With a similar focus on knowledge transfer in tourist destinations, Raisi et al (2020) analyse the diffusion of knowledge within the networks of organisations as driver of competitiveness. To date, the limited adoption of S-D logic and Service Science in tourism studies has provided few related insights on knowledge in tourist destinations (Li and Petrick, 2008; Evans, 2016). This specific body of research has tended to focus mainly on hospitality (Shaw *et al*, 2011; Cabiddu *et al*, 2013; Fitzpatrick *et al*, 2013; Davey *et al*, 2017), while few studies have addressed value co-creation and service innovation in tourism destination marketing and management (Warnaby, 2009; Line and Runyan, 2014). There is instead an increasing

attention to the value co-creation process from the residents/customer-side perspective to enhance tourists' experiences and destinations competitive advantage (Rihova *et al*, 2015; Neuhofer, 2016; Buonincontri *et al*, 2017; Lin *et al*, 2017). In this scholarly context, the notion of knowledge essentially follows the tacit (know-how) and explicit (know-that) knowledge distinction (Ryle, 1949; Polanyi, 1966), rather than their interdependence and intertwined nature (Brown and Duguid, 2001; Hoarau, 2016). Hence, the focus on the role of tacit knowledge and its conversion into explicit knowledge and skills underpinning most of the knowledge management approaches in tourism (Zehrer, 2011; Cooper, 2018). This transformation of knowledge and its management consistent with the logic of "stocks and flows" has gained particular interest in relation to knowledge transfer within and between tourist organisations (Machlup, 1979; Scott *et al*, 2008; Yang, 2008; Zach and Hill, 2017). The stocks of knowledge comprising both tacit and explicit knowledge, at organisation or destination level, provide the basis for the application of models enabling knowledge flows across individuals and networked organisations (Pyo, 2005; Cooper, 2018).

The majority knowledge transfer and innovation models, from epidemic diffusion (Baggio and Cooper, 2010) to absorptive and adaptive learning capabilities (Schianetz *et al*, 2007), imply different levels of actors' networked interaction and the codification of knowledge (Nonaka, 1991; McLeod and Vaughan, 2014; Cooper, 2018). Whereas inter-organisational network interactions support explicit knowledge flows to bolster competitiveness (Hislop *et al*, 1997; Cooper, 2018), the problematic process of codification facilitates the tacit-to-explicit knowledge conversion and, with reference to smart destinations, its transferability across networked actors (Nonaka and Toyama, 2003; Del Chiappa and Baggio, 2015; Trunfio and Campana, 2019). This view of knowledge management considers absorptive and adaptive competences (knowledge and skills) as the outcome of learning (Shaw, 2015), which entails the 'knowledge as content' and 'learning as process' distinction (Eastersby-Smith and Lyles, 2011:4). Tourism firms can identify, absorb, and exploit existing and new knowledge through learning to innovate their offerings and gain competitive advantage (Cohen and Levinthal, 1990; Teece *et al*, 1997; Camisón and Monfort-Mir, 2012; Hoarau, 2016). To ensure adaptive capacity, this approach applies to the continuous and iterative processes integrating internal and external knowledge into learning trajectories (Easterby-Smith and Prieto, 2008; Shaw, 2015). The knowledge-based capabilities of destinations and tourist organisations are, therefore, grounded in the effective management of knowledge

"stocks and flows" to facilitate adaptive and absorptive learning (Lemmetyinen and Go, 2009; Nieves and Haller, 2014). In consideration of the role of core competences and S-D logic service ecosystem (Ordanini and Parasumaran, 2011; Akaka *et al*, 2019), however, dynamic capabilities (both absorptive and adaptive) are strongly dependent on the collaboration between all actors involved to acquire and manage knowledge for value co-creation, service innovation and competitiveness (Lusch *et al*, 2010). A clear parallel with the cooperative and collaborative competences required within the heterogeneous, interconnected, and dynamic context of tourist destinations. The notion of manageable knowledge, as generated by organisational learning processes, appears to be integrated into the recent and limited body of literature integrating S-D logic in tourism management researches. Even if the knowledge-learning relationship has not been explicitly addressed in tourism empirical studies (Table 13), the approach to knowledge under S-D logic tends to be consistent with the management of knowledge "stocks and flows".

Knowledge and skills for value co-creation have been essentially applied to tourism in the form of tacit knowledge associated with human capital and intellectual capital to be converted into codified, actionable knowledge. For example, the definition of intellectual capital consisting of human, external and internal capital (Fitzpatrick *et al*, 2013) has been reconceptualised to 'develop a new intellectual capital disclosure coding instrument based on S-D logic' (Davey *et al*, 2017:1746). By considering that interaction and open discussions could generate and translate both tacit and explicit knowledge into action, Roeffen and Scholl-Grissemann (2016:43) suggest the creation of 'a community in which only former hotel guests can become members' to apply intellectual capital to value creation. In this logic, innovation and competitiveness can be influenced by firms' intellectual capital assets (Subramaniam, and Youndt, 2005) because of their association with knowledge stocks that are essential to value co-creation (Bontis *et al*, 2002; O'Cass and Sok, 2014). Different instances have also emerged from the S-D logic application to tourism management. By relying on the C-D logic (Grönroos, 2011a; Grönroos and Voima, 2013; Heinonen *et al*, 2013), for example, Rihova (2013) contend that the Customer-to-Customer (C2C) value co-creation in social tourism contexts can be understood through social practices performed according to the tourists' interpretation of shared rules and norms. Actually, they see the 'value-in-social-practice [and knowledge] as dynamic, multi-levelled, inter-subjective and

embedded in tourists' social practices', from which tourist organisations can only identify, understand and learn to facilitate the process (Rihova *et al*, 2015:361).

Table 13. S-D logic in Tourism: knowledge in empirical studies

Title	Author	Main topic/contribution	Knowledge dimension
Aspects of service-dominant logic and its implications for tourism management: Examples from the hotel industry	Shaw *et al*, 2011	Introduction of S-D logic as research paradigm in tourism management, with focus on value co-creation in hotel industry	Knowledge as operant resource and knowledge sharing to enhance value co-creation
Service-dominant logic and value in tourism management: a qualitative study within Spanish hotels managers	Hayslip *et al*, 2013	Application of S-D logic foundational premises to tourist experiences of hotels	Knowledge as operant resource
Value-creating assets in tourism management: Applying marketing's service-dominant logic in the hotel industry	Fitzpatrick *et al* 2013	Application of S-D logic to examine hotel intellectual capital disclosure	Knowledge embedded in intellectual capital consisting of human capital, internal and external capital
Destination marketing and the service-dominant logic: A resource-based operationalization of strategic marketing assets	Line and Runyan 2014	Integration of S-D logic and RBV by defining strategic assets resulting from operand and operant resources combination	Knowledge as market-based asset
Visualizing intellectual capital using service-dominant logic What are hotel companies reporting.	Davey *et al*, 2017	S-D logic operationalisation to analyse intellectual capital assessment and reporting in hotels	Intellectual capital conceptualised as operant resources providing sustainable competitive advantage

In a similar argument concerning different theoretical approaches to tourist destinations, Saraniemi and Kylänen (2011) address both S-D logic and C-D logic limitations in failing to capture the social nature of places and the intertwined relationship between production and consumption in their value creation conceptualisation. Such an "alternative" socio-cultural approach to tourist destinations entails a view of market as practice and the socio-cultural construction of knowledge embedded in the experiences of residents and tourists (Venkatesh and Peñaloza, 2006; García-Rosell *et al*, 2007; Akaka *et al*, 2013).

Even if the emerging debate on S-D logic in tourism suggests different perspectives, the predominant approach to KM in literature rests in the traditional IT realm and in-between intelligent systems design and the maximisation of economic value (Davenport and Prusak, 1998; Zehrer, 2011; Cooper, 2018). This interpretation of KM has developed along the lines

of an extensive amount of works on the progressive impact of smart technology in tourism management (Navío-Marco *et al*, 2018; Ivars-Baidal *et al*, 2019), as extended to the smart tourism and smart tourism destination domain (Table 14). The management of knowledge, through effective data and information use, has been largely acknowledged within smart tourism literature (Xiang and Fesenmaier, 2017; Sigala *et al*, 2019). There is a connection between the need to convert tacit knowledge into explicit knowledge to make it easily transferrable across smart tourism ecosystems for better governance, enhanced service provision (Micera *et al*, 2013; Del Chiappa and Baggio, 2015) and pervasive technological component of smart tourism (Gretzel *et al*, 2015b; Barile *et al*, 2017; Navío-Marco *et al*, 2018). This explains the emphasis on big data analysis, information sharing and intelligent systems to provide personalised experiences and improve destination management for competitive advantage (Sigala *et al*, 2019; Ardito *et al*, 2019a; Femenia-Serra *et al*, 2019).

Some of the actors within the smart destination (e.g. DMOs) are supposed to embrace the role of knowledge brokers or act as learning organisations capable of managing knowledge in a way similar to information management, according to the aforementioned distinction between KM and OL (Senge, 1990; Easterby-Smith and Lyles, 2011; Sheenan *et al*, 2016). Within the limited number of studies addressing smart tourism from the social perspective (Gretzel, 2011; Hunter *et al*, 2015), the salient approach to KM in smart destination draws on the tacit-to-explicit knowledge conversion and its efficient transfer to all stakeholders through intelligent systems (Buhalis and Foerste, 2015; Del Chiappa and Baggio, 2015; Raisi *et al*, 2020). Similarly, S-D logic recognises the role of ICTs and KM in enabling of value co-creation and resourcing processes (Vargo and Lusch, 2017; Carrillo *et al*, 2019). The focus on big data, IS and advanced ICTs in smart tourism ecosystem have not yet been balanced with the attention to the duality of structures and institutions (Barile *et al*, 2017; Polese *et al*, 2018; Akaka *et al*, 2019). In open innovation contexts, characterised by the coexistence of service and social systems, the management of knowledge for value co-creation entails understanding resources as social constructions (Del Vecchio *et al*, 2018; Edvardsson *et al*, 2018). The definition of smartness through human capital, social capital and innovation has furthered the smart destinations definition beyond its technical components (Boulton *et al*, 2011; Boes *et al*, 2016; Trunfio and Campana, 2019). The adoption of the human and social capital concepts, however, may present different implication for value co-creation and service innovation depending on the approach to knowledge and its management. As

regards to knowledge, human capital and social capital can be seen as the two faces of the same coin. Human capital has been defined as the stock of knowledge and skills of people, including relational capabilities and creativity, and commonly defined as a component of intellectual capital (Becker, 1994; Fitzpatrick *et al*, 2013).

Table 14. Knowledge dimensions and S-D logic in smart tourism literature (examples)

Knowledge dimensions	S-D logic aspects	Type of study	Authors
Collaborative competences: knowledge transfer facilitated by ICTs for better destination governance	Value co-creation (implicit)	Case study (supply-side)	Micera *et al*. (2013)
knowledge and skills (operant resources) capabilities to use big data to gain competitiveness in smart tourism destinations	Overall implications	Conceptual	Wang *et al* (2013)
Tourists' contextual knowledge enabled by social media and mobile communication	Value co-creation	Conceptual	Buhalis and Foerste (2015)
(information and) knowledge sharing among stakeholders of the smart tourism destination and across the DBE	-	Empirical (network analysis)	Del Chiappa and Baggio (2015)
Knowledge as competence to create personalised tourists' experiences; smart technologies empower data and information sharing for knowledge creation	Resource integration and value co-creation	Case study	Neuhofer *et al* (2015)
Human capital and social capital as operant resources defining smartness; Knowledgeable people enhance smartness and competitiveness; knowledge management facilitated by smart technologies.	Resource integration and value co-creation	Case Study	Boes *et al*. (2016)
Knowledge transfer/broker role of DMO in smart tourism destinations. Knowledge creation from data and information analysis. Intelligent agents can learn to manage knowledge	-	Conceptual	Sheenan *et al* (2016)

Social capital, on the contrary, refers to the networks of collective relationships based on common norms and values that constitute a valuable resource (Coleman, 1988; Tsai and Ghoshal, 1998; Dickinson *et al*, 2017). While human capital can be easily associated with knowledge as operant resource, the social capital resulting from collaboration and cooperation through shared norms and values appears to be consistent with the role of institutions in S-D logic service ecosystems. The combination of human capital and social capital supported by technology facilitates innovation and underpins the co-creation of value in smart tourism destinations. Yet, they may present some practical and conceptual

limitations in relation to knowledge, the tourism industry context, and the evolving S-D logic orientation. Human capital entails the tacit knowledge problematic conversion (e.g. Gourlay, 2006) and, even if co-creation is an inter-subjective process, it is also 'difficult to get away completely from the individual' (Rihova *et al*, 2015:359). Human capital has long been recognised as a powerful attribute of innovative, creative and competitive cities (Pred, 1966; Saxenian, 1996; Shapiro, 2006) and recently in relation to the integration of advanced ICTs in smart destinations (Caragliu *et al*, 2011; Ivars-Baidal *et al*, 2019). But, the emphasis on human capital and intellectual capital has raised criticism against the limited contribution of "knowledgeable tourism workers" to firms' competitive advantage due to high mobility across sectors and the consequent dispersion of knowledge (e.g. Shaw and William, 2009). Some of the main reasons concern the typical low wages and temporary employment conditions in the tourism industry (Baum, 2007), particularly for seasonal workers (Ball, 1988), even if it is commonly claimed that such high mobility may produce knowledge spillover and tacit knowledge diffusion (Hjalager, 2002; Sundbo *et al*, 2007). To benefit from valuable networks of relationships, namely social capital, on the other hand, the collaborative competences and inter-organisational knowledge are crucial to support collaboration and cooperation between actors in smart destinations (Inkpen and Tsang, 2005; Boes *et al*, 2016; Polese *et al*, 2018).

In smart destinations, therefore, social capital requires a participative approach based on data, information and knowledge sharing between all actors for value co-creation, open innovation, and competitiveness (Lara *et al*, 2016; Del Vecchio *et al*, 2018). Within tourist destinations, effective cooperation and collaboration cannot be established by the mere exchange of data and information, since the involved actors 'feel that they have complied with social norms and rules' by doing it (Beritelli, 2011:624). So, the development of social capital needs collaborative competences based upon trust and mutual understanding to produce positive effects on innovation and competitiveness (Maskell, 2000; Beritelli, 2011). This is due to the complex and dynamic nature of the smart tourism ecosystem, with blurred roles and system boundaries increasing the uncertainty level (Lusch and Vargo, 2014a; Gretzel *et al*, 2015; Gelter, 2018). Given the coexistence of different type of networks and relationships involving inter-firms and firm-consumers interactions (Inkpen and Tsang, 2005; Chandler and Vargo, 2011; Raisi *et al*, 2020), the strong ties developed on existing relationships and knowledge redundancy might hinder valuable networks of

relationships (social capital) and innovation at the tourist destination level (Zach and Hill, 2017). The actual flow of knowledge to support wider networks of relationships can be influenced by the diverse approaches to knowledge management. The sharing and use of codified knowledge across smart destination networks assumes that tacit knowledge can be transferred through online and offline networks (Del Chiappa and Baggio, 2015; Dickinson *et al*, 2017; Moscardo *et al*, 2017). Although individual entrepreneurial adaptive, absorptive and collaborative competences can be deemed as crucial to value co-creation and innovation (Lusch and Vargo, 2012b; Vargo and Lusch, 2014), the effective conversion of these capabilities into knowledge appears to be difficult and problematic (Portes, 1998; Inkpen and Tsang, 2005; Zach and Hill, 2017). For instance, the transfer of tacit knowledge is more effective across horizontal networks with strong norms and trust (e.g. local hotel networks) than vertical networks (e.g. local hotels and online travel agencies) requiring trust and reciprocity to support engagement and exchanges (Hansen, 1999; Levin and Cross, 2004; Del Vecchio *et al*, 2018). Considering the impact of vertical networks weak ties on innovation (Hauser *et al*, 2007), bridging relationships between different strong networks through brokering activities can increase the level of information homogeneity in the entire network and foster new ideas from actors otherwise excluded (Burt, 1997; Adler and Kwon, 2002).

Across this line of reasoning is possible to find similarities with S-D logic's value co-creation in service ecosystems (Akaka *et al*, 2019). The use of socially constructed knowledge to develop social capital can also show similar consistency with the S-D logic towards value co-creation and service innovation. From this perspective, the management of knowledge is embedded in the social realm and it is not given, as much as the notion social capital and resources in the value co-creation process (Putnam, 2002; McGehee *et al*, 2010; Lusch and Vargo, 2014b). Viewing knowledge as a socially constructed phenomenon also fits with the relational dimension of social capital, value co-creation and social innovation (Nahapiet and Ghoshal, 1998; Vargo and Lusch, 2014; Polese *et al*, 2018). Relational and collaborative competences, mutually shared by interpreting institutions (Lusch *et al*, 2010; Edvardsson *et al*, 2018) are, in fact, consistent with the relational and structural facets of social capital, rather than its cognitive aspects (Nahapiet and Ghoshal, 1998; Inkpen and Tsang, 2005; Barile *et al*, 2017). Besides, this view might underestimate the influence of tacit knowledge to radical innovation (Pérez-Luño *et al*, 2011) and contrast the distinctive advantage of

closed networks with strong norms and relationships (Coleman, 1988; Putnam, 2002). Indeed, the combination of close relationships with the insights, intuition and expertise of tacit knowledge fosters new ideas and radical innovation (Polanyi, 1966; Nonaka, 1994). The relational nature of social capital helps to manage the tacit knowledge conversion and its transfer to generate innovation (Inkpen and Tsang, 2005). A practice-based view of knowledge and value co-creation can be used as an overarching approach to solve such controversies (Brown and Duguid, 2001; Rihova *et al*, 2015). The social-practice view of knowledge suggests that the tacit and explicit knowledge are entwined and inseparable (Hislop, 2009), since the tacit knowledge without practice would remain in the intellectual domain (Polanyi, 1966). Similarly, the application of social practices to value co-creation and resourcing processes bridges their subjective and intersubjective meanings in the light of the fact that 'practices are a combination of bodily-mental routines (Edvardsson *et al*, 2012:99). Following this practice-based view, the shared, mutual, and explicit knowledge and value substitutes its subjective dimension in resourcing and value creation processes (Schatzki, 1996; Rihova *et al*, 2015; Hoarau, 2016). A critical issue for smart destinations, however, stands in understanding flow and retention of knowledge-based practices for value co-creation within their service ecosystems.

In the light of the smart tourism destinations strong reliance on ICTs (Gretzel *et al*, 2015b), the process of *dis-embedding* and *re-embedding* knowledge across the network of actors is not linear and the related practices might differ depending on either strong or weak relationships in place among stakeholders (Brown and Duguid, 2001; Del Chiappa and Baggio, 2015). The retention of knowledge-based practices in different smart ecosystem contexts (e.g. horizontal networks) would hinder the unbundle and rebundling of available offerings by tourism firms and tourists because of the lack of the necessary competences to integrate resources (Normann, 2001; Akaka *et al*, 2012; McLeod and Vaughan, 2014). Open innovation approaches could mitigate such issues by providing an environment in which inflows and outflows of knowledge support new ideas to co-create value through a network of internal and external stakeholders (West and Bogers, 2014; Egger *et al*, 2016). With regard to the co-creation of value in an open innovation context, Hoarau (2016:144) observe that 'service-dominant logic brings the idea of openness in innovation processes closer to a practice-based perspective on knowledge'. Thus, smart destinations could gain competitive edge through the unique capability of using advanced ICTs in combination

with the management of knowledge-based practices flows to enhance services based on the co-creation of value for firms, tourists and residents (Ivars-Baidal *et al*, 2019). Data and information are the common substrate for service-based and knowledge-based practices in smart tourism ecosystems (Gretzel *et al*, 2015b; Lusch *et al*, 2010; Trunfio and Campana, 2019). Given that knowledge management technologies and intelligent systems support efficient and effective data/information distribution across actors (Fuchs *et al*, 2013), the individual and collective practices resulting from their use can be dispersed in different loosely coupled networks or communities (Dickinson *et al*, 2017; Moscardo *et al*, 2017). Unlike ICTs and data, in fact, social practices underpinning both knowledge and services cannot be liquefied and, consequently, easily transferred or moved to provide solutions at the right place and time (Norman, 2001; Lusch *et al*, 2010; Lusch and Vargo, 2012). The reason is that knowledge-based practices and service practices (i.e. resource integration and value co-creation) are embedded in a social context nested in smart service systems (Edvardsson *et al*, 2012), which are constantly produced and reproduced through the enactment of negotiated actions (Giddens, 1984; Vargo and Akaka, 2012). Given the recent S-D logic developments (Evans, 2016; Pellicano *et al*, 2018; Troisi *et al*, 2019), service innovation in smart tourism ecosystems can be triggered by knowledge-sharing practices adopted by the different networks of actors to integrate resources for value co-creation (Spohrer and Maglio, 2008; Edvardsson *et al*, 2012; Skålén *et al*, 2015). The socially-based view on both knowledge and value co-creation as main sources of competitive advantage may also solve the conflict between the exogenous view of the value co-creation process and the endogenous inside-out approach of strategic management (Vargo *et al*, 2008; Edvardsson *et al*, 2011; 2012).

4.4 Structural and procedural preliminary frameworks

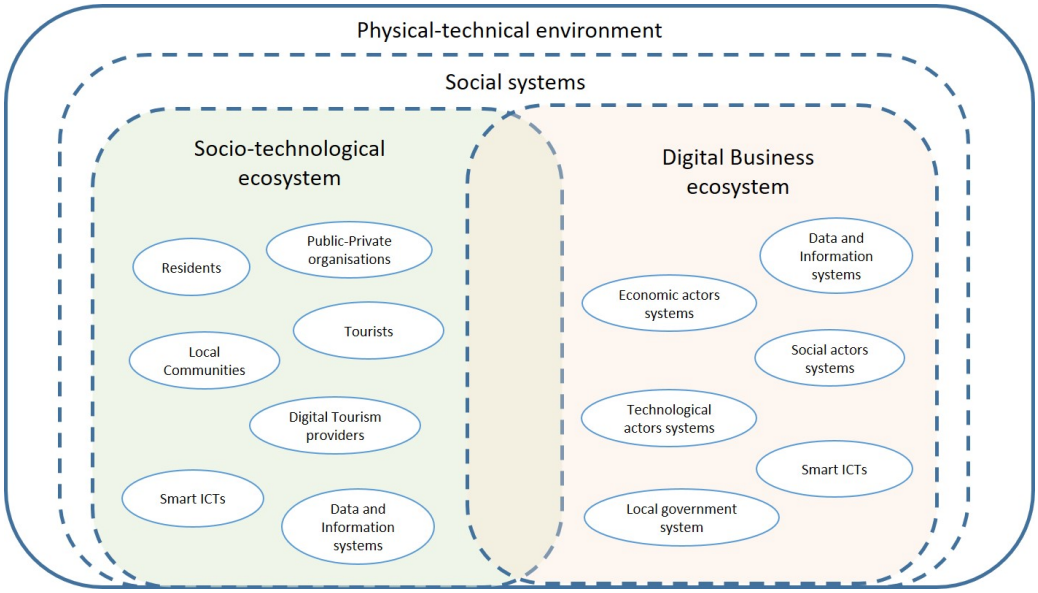
The critical review of the literature has provided several insights to produce two distinct and interrelated preliminary conceptual frameworks related to the structure of the smart tourism ecosystem and the process of value creation. As a complex and dynamic context, the conceptualisation of smart tourism destinations has been gradually evolving beyond its technological foundations towards a holistic view integrating the "*soft*" components of smartness, such as innovation, value co-creation and knowledge (Buhalis, 2015; Boes *et al*, 2016; Polese *et al*, 2018). Although value co-creation has been deemed fundamental to innovation and competitiveness of tourist destinations and organisations (Trunfio and

Campana, 2019; Coca-Stefaniak, 2020), smart tourism ecosystems are still considerably associated with their technological dimension (Navío-Marco *et al*, 2018; Ye et al, 2020). With particular relevance to this study and the gap identified in the literature, the supply-side perspective has been significantly overlooked in smart tourism studies (Mehraliyev *et al*, 2020), as with empirical studies addressing S-D logic and Service Science value creation in smart destinations (Mohammadi *et al*, 2020) and their social dimension (Yigitcanlar *et al*, 2019).

In agreement with the most recent conceptualisation of smart destinations and the latest S-D logic developments, smart tourism ecosystems have been recognised as complex and adaptive contexts within which value can be co-created and services exchanged and/or enhanced through networked interactions across stakeholders. In view of smart tourism destinations as smart tourism ecosystems, the simplified and high-level framework shown in Figure 20 incorporates the socio-technological and digital business ecosystems of the Oxford Road Corridor of Manchester (Section 4.5). Through an open and flexible approach to empirical findings, the framework will be used as a guiding context of the value creation process embedded in the interconnected ecosystems of the Corridor. In essence, this model incorporates the physical, digital, economic, and social layers as major structural and strongly interrelated components framing and potentially influencing, value creation. This preliminary framework embodies a multidimensional environment consistent with the S-D logic service ecosystem concept adopted in smart tourism researches addressing value creation. Being informed by the extensive review of the literature, in fact, the model synthesises the context for the conceptualisation of the value creation process based on the data and information, ICTs and inter-organisational knowledge constructs of smart tourism service ecosystems. In line with the recent S-D logic, Service Science and strategic management developments, this contextualisation of the value creation process has been informed by the holistic and critical review of the literature that suggested the supply-side and the social constructivist view of the constructs to address the research problem and answer the questions of this study. This overarching view of value co-creation recognises and integrates all of the essential components of the process characterised by the 'duality of structures (rules and resources) and systems (reproduced relationships)', particularly social systems, and influenced by the shared rules, norms, practices and meanings, or institutions (Vargo and Akaka, 2012:213). Thus, the view of value creation and resourcing

processes occurring in smart destinations as social constructions offers valuable insights into the practical and interconnected role of their components. Service exchanges and value creation have been increasingly associated with the integration of data and information resources that can be easily digitised, transmitted, and remotely accessed almost everywhere using the ICTs, especially mobile technologies. The diffusion of smart ICTs at relative lower costs, in fact, arguably enables easier access to technology, data and information for resource integration, decision making, enhanced value propositions and service provisioning.

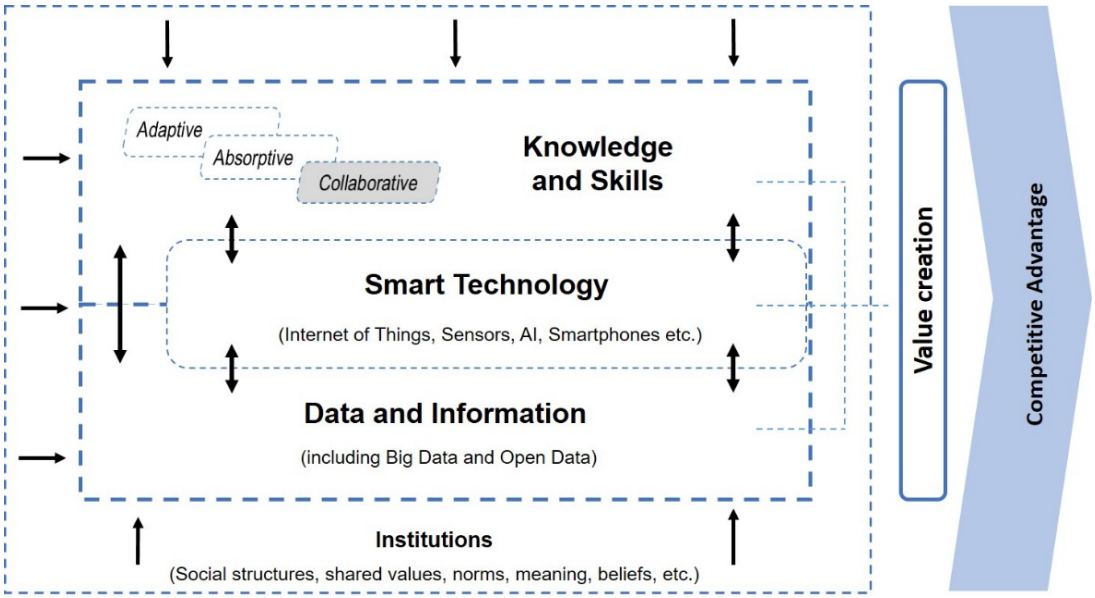
Figure 20. Smart destination ecosystem structure: preliminary conceptual framework



To understand the dynamic relationship between smart ICTs, data and information, the duality of technology has been recognised in terms of being a medium or enabler (operand resource) as well as a resource triggering other resources (operant resource) (Akaka *et al*, 2014) and essential to service innovation, value creation and smart service ecosystems re-formation (Polese *et al*, 2018). The role of knowledge as the most prominent operant resource for the co-creation of value and the main source of competitive advantage will be interpreted in the form of collective inter-organisational competences and capabilities related or applied to data, information and smart ICTs. Across the multitude of different actors embedded in the overlapping and blurred service systems (i.e. residents, tourists, intermediaries, and service providers), the flow of knowledge is crucial to innovate service and differentiate to gain competitive advantage through value co-creation. Provided that value creation processes are embedded in both socio-technological and digital business

ecosystems of smart tourism destinations, the socially based view of inter-organisational knowledge practices requires an analysis of collaboration and coordination capabilities that are contextually situated in a way that can enable the integration of data, technology, knowledge and skills. The management of knowledge based on collective and situated practices can also solve the potential conflict between the exogenous resourcing process and endogenous trajectories of knowledge towards competitive advantage, as advocated by the RBV, DC and KBV inside-out strategic management perspectives. On the account of all these insights, the procedural framework displayed in Figure 21 provides an overview of the value creation process within a smart destination through its major conceptual constructs. By graphically showing the relationship between the different components involved, this preliminary model guided the research in all its different stages.

Figure 21. Value creation process: preliminary conceptual framework



In reference to the integration of resources for value creation and service innovation, the collaborative knowledge, as well as absorptive and adaptive skills, are assumed to be based on socially constructed practices interrelated with institutions and smart ICTs. As operant resource, knowledge and skills are preliminarily illustrated as "*independent*" from smart ICTs, which are in turn separated from data and information, assumed as "*raw material*", or operand resource. Both frameworks should be deemed as the representation of the conceptual territory to be explored and examined through an iterative research process (Miles and Hubermas, 1994), rather than a fixed set of assumptions rigidly guiding this

study. The use of the framework as a flexible tool, in fact, allows a reflexive approach to concepts, relationships and themes emerging from data, with possible alternative views and interpretations, throughout the research process. Therefore, the framework is used as a flexible conceptual model under review and modifications according to empirical data findings, to which the author adopted an open and responsive approach.

In the light of the critical review of the literature and informed by the research question and sub-questions, the following propositions are presented hereafter.

Proposition A. Service exchanges and value creation are enabled or restrained by data and information, collective knowledge-based practices, and social interactions.

Proposition B. Service innovation is co-produced through the relationship between collective knowledge-based practices and smart technology enabling value creation, with the aim to differentiate and gain competitive edge.

Proposition C. Asymmetry and uncertainty in a smart tourism ecosystem are mutually related, with implications for the process of value creation and service innovation. Their impact can be mitigated by the adoption of a socially based view of knowledge management for value creation.

Proposition D. Different types of Institutions (shared norms, rules, symbols, beliefs and meanings) and institutional arrangements affect the application of socially based knowledge in value creation processes.

4.4.1 Main conceptual assumptions

The following conceptual assumptions underlie the analysis of value creation in the smart destination ecosystem of Manchester.

- The participation of tourists, residents and local communities in the co-creation of value in smart destinations is beyond the scope of this study and it is considered as intrinsic to the notion of *value co-creation*, which has been used interchangeably with *value creation* in the light of the fact that 'the service versus goods debate is no longer central' in marketing literature (Achrol and Kotler, 2006; Carlborg *et al*, 2014:384; Vargo and Lusch, 2017).

- Data, information, and explicit knowledge are exchanged to create value within the smart tourism destination ecosystem (Lusch *et al*, 2010; Edvardsson *et al*, 2011). When people and organisations, or actors, take part in the co-creation process, they primarily exchange their specialised capabilities and skills (knowledge), rather

than services or products. Also, knowledge is not assumed as logical progression of data and information, which are recognised as operand resources.

- Value co-creation and inter-organisational knowledge are interpreted as socially constructed phenomena embedded in the socio-technological and digital business context. As such, both the subjective value and tacit knowledge are assumed to be replaced by their mutual and shared form (Löbler, 2011; 2013), which is justified in philosophical terms (Section 5.2.2).

- Value creation and KM practices and processes are recognised here as exogenous phenomena in relation to people, organisations, and ICTs (service system). The socially based approach to knowledge, as source of competitive advantage and key resource for value co-creation, entails endogenous dimensions embedded in their explicit form.

- Collective knowledge-based practices and processes are interpreted as sources of value creation and service innovation in the so-called Business-to-Business (B2B) context of smart destinations. In this study, the interpretation of these practices is not based on participant observation.

- Tourists and residents use the same services, which implies there is no distinction between tourist and residents service provisioning (e.g. transportation). This study recognises and assumes that 'the boundaries between tourists and locals become blurred' (Bock, 2015:25), especially in smart tourism destinations (Gretzel *et al*, 2015b; Femenia-Serra *et al*, 2019)

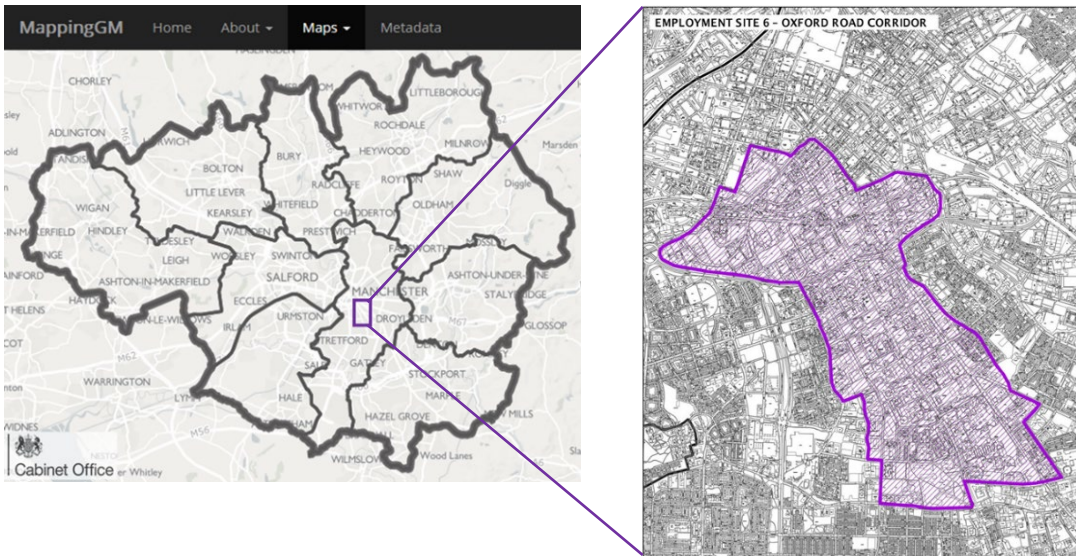
- The public and private organisations of interest to this study operate in the Oxford Road Corridor, and thereby not necessarily located/headquartered in this specific area.

4.5 The Manchester Oxford Road Corridor

This study identifies the Manchester Oxford Road Corridor as the smart ecosystem context in which the value creation process will be analysed. The Oxford Road Corridor, also known as the Corridor, encompasses an area of approximately 1 square mile (or 2.7 km^2) running south of the city centre, along the length of Oxford road, and extending east and west of the main trajectory (Figure 22). Along with the 42,000 residents, 74,000 students, 79,000 people, and 6 million tourists each year, respectively living, working and visiting the area (Oxford Road Corridor Partnership, n.d.), several knowledge-intensive organisations like universities, health institutions, research centres, creative industries, digital and financial service are located in the corridor (Appendix 2). As innovative district, with digital, creative,

and cultural facilities and enterprises, the Corridor has been highly recognised as the area for the strategic socio-economic and technological development of Manchester.

Figure 22. Greater Manchester Metropolitan area and the Corridor



(MappingGM, 2019; Manchester City Council, n.d.)

In 2019, the total economic and business impact of the Corridor accounted for £3.6 billion Gross Value Added (GVA) per annum, which contributed to 20% of Manchester's economic output over the last five years and a concentration of businesses and graduate Start-Ups in R&D, Digital, Energy and Data sectors (Appendix 3). In the last 5 years (2015-2020), the planned and committed investments totalled £1.5 billion for the economic, technological, cultural, social and sustainable development of the Corridor through infrastructural and regeneration programmes, including public transport, housing, carbon emission reduction, health and social care and smart urban projects (Manchester City Council, n.d.). With the aim of managing and/or attracting resources, investments and projects, the Manchester City Council established the Corridor Manchester Partnership (or Corridor Partnership), in 2008, with several local academic institutions and organisations. Table 15 shows the major local organisations engaging in the Corridor Partnership and their partnering role. Through a series of public consultations open to stakeholders, including residents and communities, the Corridor Partnership envisioned a long-term strategy (2015-2025) based on seven themes focusing on the economy, place, people major areas of development. As stated in the Corridor strategic vision document (Manchester City Council, n.d.), by 2025, Corridor Manchester will be:

Manchester's cosmopolitan hub and world-class innovation district, where talented people from the city and across the world learn, create, work, socialise, live, and do business, contributing to the economic and social dynamism of one of Europe's leading cities.

Table 15. Corridor Manchester Partnership members

Partnership members	Description	Type of membership
Manchester City Council	Local government authority for Manchester.	Board member
University of Manchester (UoM)	The largest single-site University in the UK. The Russell Group university is committed to world-class research, outstanding learning and student experience, and social responsibility.	Board member
Manchester Metropolitan University (MMU)	Public university that gained university status in 1992. Voted the greenest university in the UK, Manchester Met is one of the largest higher education and research centres in UK.	Board member
Manchester University NHS Foundation Trust	Formed on October 2017 as the merger of Central Manchester University Hospitals NHS Foundation Trust and University Hospital of South Manchester NHS Foundation Trust.	Board member
Bruntwood	Family-owned property company providing office space, serviced offices, retail space and virtual offices, meeting, and conference rooms	Board member
Royal Northern Music College (RNMC)	Leading international conservatoire located in the heart of Manchester, with a reputation for attracting talented students, teachers, conductors, and composers from all over the world.	Board member
Manchester Science Partnership (MSP)	public, private, academic partnership set up to accelerate innovation in life sciences and technology and provide businesses with direct links into research, the NHS, and local government.	Board member
HOME	Manchester's centre for contemporary theatre, film, art, music, and other cultural events.	Board member
Future Everything	Grass-roots digital non-profit organisation established in 1995, with a leading role in exploring the intersection of technology, policy making, art, innovation, and culture.	Member
Palace Theatre	Non-profit performing arts centre that hosts its own professional company, youth, and teen programs as well as presenting acts.	Member
Contact	Manchester Young People's Theatre Ltd is a national theatre and arts venue working with young people and world-class artists to produce and present a diverse programme for everyone	Member
The Whitworth	Art gallery founded in 1889 and located in the Whitworth Park, along the Oxford Road. The gallery is part of the University of Manchester.	Member
Manchester Museum	The Museum dates back to 1821 and displays works of archaeology, anthropology, and natural history. Like the Whitworth, it is part of the University of Manchester and located within its campus on Oxford Road.	Member
Creative Tourist	Editorial organisation managing an arts and travel website uncovering and running cultural events in Manchester and the North of England.	Member
Manchester Met School of Art	Established in 1838 as the Manchester School of Design, it is the second oldest art school in the UK after the Royal College of Art and part of MMU.	Member

(Oxford Road Corridor Partnership, n.d.)

In terms of guiding the investments and the collaborative work of partners to achieve this objective, the strategic vision has been complemented by the Strategic Spatial Framework (Deloitte, 2018) across all of the seven strategic themes to maximise the Corridor's assets

through physical and digital infrastructure developments (Appendix 4). In line with the idea of urban areas regeneration (Jones and Evans, 2013), the adoption of the Strategic Spatial Framework has encouraged future developments concerning, for instance, the creation of the new Circle Square area hosting new offices, restaurants, shops and a hotel, alongside the School of Digital Arts (SODA) as part of the MMU's creative campus and the expansion of University of Manchester north campus facilities for research and innovation (Deloitte, 2018). Such transformational investments in the area have included enhancing transport infrastructure to allow the sustainable access and travelling (e.g. walking and cycling) of residents and visitors throughout the area (Oxford Road Corridor, n.d.). Similarly, the use and improvement of the digital infrastructure has been associated with smart urban and sustainable development objectives. To actual achieve the wider strategic objectives, the collaboration and engagement by all stakeholders has been also deemed essential. As such, the overall strategic view for the Corridor aligns with the notion of smartness applied to cities and urban areas (Caragliu and Del Bo, 2019). Indeed, the "*Developing Smart City Infrastructure and Service*" objective is integrated into the "*Place*" theme for residents and visitors services creation and improvements through smart ICTs alongside the integration of 'green and smart ideas into new development and investment proposals' (Manchester City Council, n.d.; Deloitte, 2018). Consistent with such a strategic vision, more than 30-40 smart city projects and initiatives, funded by EU, national and local investments, have also been rolled out and completed within the Corridor, part of the Council-led smarter city programme (Caird and Hallett, 2019).

4.5.1 The Corridor as smart tourism ecosystem

The current smart city strategy has been built on Manchester's digital innovation agenda of the early 2000s and evolved throughout several dedicated agencies programmes and initiatives. This evolution entails the progressive changes in public policies concerning the transformation, or translation, of digital strategies into smart urban strategies by keeping and expanding the focus on technology and citizen empowerment towards socio-cultural, economic and environmental objectives (Appendix 5). As evidenced by the screening of recent smart city projects in Manchester (Appendix 6), the Corridor has been identified as the testbed for the implementation of smartness in the city. Several authors (Boes *et al*, 2016; Caird and Hallett, 2019), in fact, refer to the scaling up of smart city pilot initiatives rolled out in innovation districts characterised by their knowledge-intensive activities and

strategic location. In this respect, the identification of the Corridor as STE can be related to its physical, digital, social and business components (Sections 2.2 and 2.3) as well as the combination of organisation contributing to the smartness of the area and the city alike (Table 16). Across data, information, technology and knowledge components it is possible to identify the multidimensional socio-technological (e.g. HOME and Republic of Things) and digital business (e.g. start-ups in Science Park) layers of the STE. Rather than based on the contribution of the individual actors, the combination and integration of the different services and businesses characterises the Corridor's smartness. As a tourism ecosystem, the Corridor highly benefits from its strategic position, in between the airport and the city centre, and the fact that, between 1999 and 2019, Manchester has been the second most visited city in England and the third in the UK (Visit Britain, 2019). The interconnected and changing relationships between all actors operating in the smart Corridor, and the blurred boundaries of tourists and residents' services, provide additional evidence of the complex dynamics of the ecosystem. So, not surprisingly, the same public and private organisations participate to the different smart city initiatives, with contributions to the development of smart solutions. However, the Corridor as smart tourism ecosystem does not necessarily define Manchester as smart tourism destinations. Although Manchester has been widely deemed as a smart destination by scholars (Nam and Pardo, 2011; Cocchia, 2014; Cowley *et al*, 2018; Paskaleva and Cooper, 2019), the journey towards actual smartness is still at its early stage of development (Caird and Hallett, 2019).

Empirical studies focusing on smart destinations have usually relied on smart city ranking to select the best performing destinations (e.g. Boes *et al*, 2016) or tourist destination status, vocation, and visitors' statistics (e.g. Buonincontri and Micera, 2016). Still, smart city classifications can present some issues related to the use of heterogeneous indexes and measurements. Despite recent attempt to provide a common classification across the EU (Manville *et al*, 2014), smart city rankings can differ at national and international level (De Santis *et al*, 2014) and all conventional indicators are hardly measured with accuracy or they are only available at national level (Giffinger and Gudrun, 2010; Kitchin, 2019). The foundations of the smart city concept are empirical and mostly based on the bottom-up application of ICTs, whilst an increasing attention to its theoretical development has come after the EU recognition of smart cities' impact on regional development (Cocchia, 2014). This is reflected in the challenging task of conceptualising smart destinations beyond the

its technological component or the extensive use of case study and conceptual methods (Ye *et al*, 2020). As such, smart city initiatives are often considered as selective geolocated experiments (Viitanen and Kingston, 2014) investigated and referred in smart destinations case study researches (Mehraliyev *et al*, 2020).

Table 16. Corridor as Smart Tourism Ecosystem - Key Organisations

Key organisations	Smart layer / component	Contribution to the Smart Tourism Ecosystem
Manchester Science Partnership (MSP)	Physical and Knowledge	Facilities for knowledge and innovation, including Tech incubators and spaces for events (e.g. Science Park; Manchester Technology Centre)
Bruntwood	Physical and digital	Facilities for Physical-Virtual offices; Research & Meetings (Citylabs 1.0, Bright Building/Science Park); Retail spaces (Circle Square, the Hatch)
University of Manchester (UoM)	Physical and Knowledge	Campus facilities, Research, and knowledge transfer (including smart urban studies)
Manchester Metropolitan University (MMU)	Physical and Knowledge	Campus facilities, Research, and knowledge transfer (including smart urban studies)
PixelMill (former Clicks + Links)	Digital and smart ICTs	Virtual Reality specialists in interactive experiences for industry, training, and city planning.
See.Sense	Data and smart ICTs	Smart Pilot project based on sensor-enabled bike lights technology which collect data that feeds into the CityVerve BT Transport Data Hub
Ordnance Survey	Data and smart ICTs	Provider of geodata map visualisation for travellers flows across the Corridor (e.g. See.Sense data) for smart solutions.
Asset Mapping	Data and smart ICTs	Data collection and processing for smart buildings development (Environmental and Energy efficiency) across the Corridor
Republic of Things	Smart ICTs, data and social	Sensor data analytics solutions for public and private organisations. Co-creation of IoT solutions for social care and transport in the Corridor (IoT factory)
Stagecoach; First (Group) Bus	Services	Public transport (smart ticketing, “talkative” bus stops)
Manchester Museum; The Withworth	Social and Cultural	Art galleries, Exhibitions, Socio-cultural events, and restaurants
HOME	Social, Cultural and Business	Art Gallery, Theatres, Meetings, and restaurant
The Principal and Crown Plaza hotel	Business	Hospitality, Conferences, and event services
Circle Square	Social and Business	Living spaces, Retail and Leisure services (offices, shops, bars, restaurants, and gyms)
Palace Theatre (Ambassador Theatre Group)	Social and Business	Entertainment, Events and Leisure services

Considering the wide range of actors involved in the different smart city initiatives and the visitors flow in the area, the Corridor is selected for this study as the environment in which the co-creation of value (i.e. the phenomenon of interest) can occur and knowledgeable participants are likely to be found. In such a context, different actors exchange service in different ways through the use of data and information (operand resource) and smart ICTs (operand and/or operant resource), while applying inter-firms knowledge-based practices (operant resource) to co-create value. As a result, all actors operating in the smart urban ecosystem of the Corridor are involved in the use of data and information, smart ICTs and knowledge when providing services. Thus, the geographically bounded context supports knowledge-sharing practices, alongside data and information flows, and facilitate data collection in the light of the concentration of participants.

4.6 Chapter conclusions

On the grounds of resource integration, innovation and competitive advantage principles, The S-D logic paradigm is consistent with the strategic management views to address the value creation processes in smart destinations. Both views recognise the application of specialised knowledge and skills as a strategic resource for the collective generation of value, service innovation and competitiveness in smart tourism ecosystems. While S-D logic considers specialised knowledge as a high-order resource determinant to the transformation of potential resources into meaningful resources (i.e. resourceness) for value co-creation (Lusch *et al*, 2007; Madhavaram and Hunt, 2008), strategic management theories and models similarly identifies knowledge as the source of competitive advantage based upon innovation (Lloria, 2008; Hoarau, 2016). This holds particularly true to the KBV approach (Khadir, 2020), rather than the RBV perspective, which considers knowledge as one of the key resources among all others (Nieves and Haller, 2014).

The application and exchange of knowledge in smart destinations has been characterised by a static and codified view of knowledge-based assets enhancing the transfer and sharing of skills and know-how across all actors involved in the value creation processes (Williams *et al*, 2020). Such a widespread approach to knowledge management is inconsistent with recent conceptualisations of the service ecosystems, and smart tourism ecosystems, which are based on value-in-social-context (Section 3.2) the complexity of the smart destinations (Sections 2.2. and 2.3). Considering the emphasis placed on open innovation an open data in smart tourism destinations, the smart ICTs-based approach to knowledge management

might overlook the collaborative, human and social dimensions, which add complexity to the tacit to explicit knowledge transformation for value creation. An approach based on the social construction of both knowledge and value creation appears to be appropriate and barely explored for smart tourism ecosystems.

The Manchester's smart Corridor context and the tentative conceptual frameworks were also presented in this chapter on the basis of the critical review of the literature (Chapters 2, 3 and 4). The analysis of the selected streams of literature provided the key insights to build the preliminary structural and procedural frameworks (Section 4.4) that will help in gaining a holistic understanding of the value creation process within the smart Corridor ecosystem. The main conceptual assumptions in Section 4.4.1 and the definition of the Corridor as a smart tourism ecosystem (Sections 4.5 and 4.5.1) clarify the overall approach to the analysis and delineate its geographical and socio-economic boundaries.

Chapter 5. Research methodology

5.1 Introduction

This chapter presents the methodological approach adopted by this research to investigate the value creation process within the smart Corridor of Manchester. To meet the aim and objectives of this study, the methodological choices concerned the philosophical position, mode of inquiry, research strategy and the methods used to collect and analyse the data. In addition to these significant decisions, the criteria sustaining the trustworthiness of the adopted methodology and limitations are also addressed, along with authenticity and the ethical considerations. When describing the interpretive-qualitative research approach, the rationale supporting and justifying the adoption of a single-case study strategy and the use of semi-structured interviews will also be presented in connection with the selection of key informants and the role played by secondary data in the overall analytical process.

5.2 Methodological stance of the study

The research process develops from the approach to "truth" and social reality (ontology), the way the researcher comes to know them (epistemology) and the methodology used to gather knowledge about the social reality (Guba and Lincoln, 1994). The basic set of beliefs, values, and techniques (research paradigm) adopted by the researcher for any systematic inquiry consists of all of these components (Kuhn, 1970; Denzin and Lincoln, 2005). The choice of an appropriate methodological approach depends on the choice of the research paradigm that guides both research design and outcomes. There is no better approach to conduct qualitative research and research methods can be independent of philosophical underpinnings, as long as they are justified as the best way to answer to research questions (Denzin and Lincoln, 2008). The combined use of qualitative and quantitative methods, or mixed methods, might be either related to interpretivism, positivism or realism paradigm (Creswell, 2013). In qualitative studies, philosophical paradigms (Table 17) have not been entirely opposed one another and, to a certain extent, they might be linked to different methods without losing 'methodological legitimacy' (Lee, 1991:343). Yet, the distinction between qualitative and quantitative methodologies tend to be based on the predominant type of data (numbers or words), type of analysis and collection method.

Quantitative methodologies are usually guided by a positivist and/or critical perspective. Such methodologies concern the use of the hypothetical-deductive model to investigate

causal relationships between variables and test formal propositions through quantifiable measurements. In this sense, positivist marketing researchers are inclined to identify and measure the value jointly created by firms and customers. For instance, researchers can address value co-creation in terms of cooperative asset resulting from service exchange (Xie *et al*, 2016) or assess customer-experienced value in use for e-services through survey and inferences from a representative sample (e.g. Heinonen and Strandvik, 2009). This is in line with the majority of service marketing research, which 'has its dominant roots in a positivistic paradigm' (Tronvoll *et al*, 2011:563). Qualitative methodologies, instead, relate to interpretivism. Marketing researchers adopt this approach with the 'aim to produce insights rather than measure, to explore rather than pin-down' (Hanson and Grimmer, 2007:60). By drawing on constructivism assumptions, this kind of research are essentially descriptive, experiential, or exploratory in nature, with in-depth understanding of complex phenomena (Walsham, 1993). In these studies, causes and effect cannot be distinguished, and the researcher is part of the phenomenon being investigated (Blaikie, 2007), mainly through single or multiple qualitative methods including ethnography, case studies and interviews (Myers, 2013).

In service marketing and management as well as value-related research, 'most typically, positivists have emphasized exchange value, while interpretivists emphasize use value' (Peñaloza and Venkatesh, 2006:303). Given the complex dynamical nature of the value co-creation process, implying socially constructed practices and activities (Holttinen, 2010; Edvardsson and Tronvoll, 2011; Löbler, 2011), S-D logic research tend to be linked with interpretivism and the relativist perspective (Edvardsson *et al*, 2011; Akaka *et al*, 2013; Brodie *et al*, 2019). In this specific domain of research, however, the context of studies is still heterogeneous. Different methodologies have been adopted to explore and measure the co-creation of value (Kryvinska *et al*, 2013; Saarijärvi *et al*, 2013; Campos *et al*, 2018), from different views (provider, customer and networks) and across industries (Galvagno and Dalli, 2014). This is quite consistent with the cross-disciplinary approach of Service Science and the meta-theoretical nature of S-D logic (Spohrer and Maglio, 2008; Vargo and Lusch, 2017; Brodie *et al*, 2019). The combination of theories informing the S-D logic's comprehensive framework entails the translation of different philosophical assumptions into appropriate methodologies applied to value co-creation investigations.

Table 17. A three-fold classification of research philosophy and methodology

Research Paradigm and Philosophy	Ontology *(Beliefs about Physical & Social Reality)*	Epistemology *(Beliefs about Knowledge)*	Axiology *(Relationship Theory-Practice)*	Methodology *(Approach to acquire Knowledge)*	Method *(Tools to acquire Knowledge)*
Positivism	Assumption of an objective physical and social world that exists independently of humans, and whose nature can be apprehended, characterised and measured	Unilateral and causal relationship discovered by deduction. Theories are empirically tested through hypothesis (verification or falsification)	Inquiry is value free and unbiased. Theory-Practice relationship is technical. Researchers are independent of data and phenomena investigated	• Experimental and survey research. • Hypothetic-deductive model. • Causal model with independent and dependent variables	Mostly Quantitative (mainly numbers), with probability sampling and statistical analyses (Descriptive and Inferential)
Interpretivism	Reality is a social construction and cannot be understood independent of the actors who make that reality	Phenomena can be studied in their social setting(s) through inductive reasoning and in-depth examination of the field of research. Interpretations of practices and meanings from a participant/subjective perspective	Research is value-bound. Researchers are part of what is being investigated and cannot be separated. Weak constructionists adopt various techniques. Strong constructionists enact the social reality under investigation	• Exploratory and descriptive research • Inductive and participatory model • Theory generation and in-depth insights	Mostly Qualitative (mainly words), with purposive sampling and thematic analyses (categorical and contextual)
Critical realism	Social reality is historically constituted. People can change their social and material circumstances. This ability is constrained by systems of social domination. Social reality is produced by humans, but also possesses objective realities which dominate human experience	Knowledge is grounded in social and historical practices. There can be no theory-independent collection and interpretation of evidence to conclusively prove or disprove a theory. Because of commitment to a processual view of phenomena, critical studies tend to be longitudinal	Research is value laden. Researchers aim to initiate change in the social relations and practices. Social research and social theory are understood as social critique	• Confirmatory and exploratory research • Deductive and Inductive (Abductive) model • Dialogic/Dialectical approach	Quantitative and Qualitative (mixed method), with probability, purposive and mixed sampling. Integration of thematic and statistical analysis (e.g. Critical discourse and Action Research)

(Adapted from Orlikowski and Baroudi, 1991; Blaikie, 2007; Denzin and Lincoln, 2005; 2008; Myers, 2013)

Empirical works adopting quantitative methodologies often tend focus on the customers' relationships, behaviour, loyalty, and satisfaction measurements of the value co-creation processes (Yi and Gong, 2013; Cossío-Silva *et al*, 2016; Ranjan and Read, 2016). Conversely, qualitative methodologies commonly explore consumption processes, users' experiences and the practices embedded in a social context (Schau *et al*, 2009; Korkman *et al*, 2010; Neuhofer *et al*, 2013). In the context of empirical studies on value co-creation in tourist destinations, methodological choices appear to be equally distributed between qualitative and quantitative approaches (Table 18). Along with the use of survey and case study, the single method approach is slightly more common than the multi-method design. While qualitative studies are associated with the stakeholders, firms, DMOs perspective on value creation processes, quantitative researches focus on the evaluation of the tourists, users, residents' performances, and contributions to co-created experiences. Considering value co-creation as a central tenet of the service-centred logic proposed by Vargo and Lusch (2004), the limited adoption of experimental design in the context of tourist destination could be related to the challenges in applying and testing S-D logic's holistic view (Williams and Aitken, 2011; Evans, 2016).

Similarly, the fact that few studies have combined qualitative and quantitative methods could be due to time demands, financial resources and publishing constraints (Teddlie and Tashakkori, 2003; Creswell and Plano Clark, 2007), rather than the philosophical paradigm foundations or intrinsic strengths and weaknesses (Bryman, 2015; Popesku, 2015). Such heterogeneity in the form of methodological approaches addressing value co-creation is consistent with the multidisciplinary nature of tourism and the tourist destination domain thereof (Laws and Scott, 2015; Campos *et al*, 2018; Ye *et al*, 2020). The different paradigmatic views have been equally translated in different methodologies to produce a diverse corpus of tourism knowledge (Tribe *et al*, 2015; Tribe and Liburd, 2016). As discussed later (Section 5.2.2), the philosophical assumptions underpinning the study of value creation in smart destinations are particularly rooted in the interpretive paradigm and social constructivism. To address the aims and research questions of this study, the relativist interpretive stance suggests the use of the qualitative methodological approach to produce more in-depth insights than quantitative methodology.

Table 18. Methodologies and value creation empirical studies in tourist destinations

Research study	Authors	Research topic (Perspective)	Methodology	Methods	Sampling	Method design
Content, context, and co-creation in tourist destination branding (Portugal)	Oliveira and Panyik, 2015	Destination branding with User Generated Content (Users)	Qualitative	Case Study	Relevant	Mono method (content analysis)
Social Innovation in STEs	Polese *et al*, 2018	Sustainable Value Co-Creation (Firms)	Qualitative	Case Study	Purposive	Mono method (Interviews)
Customer-Based Brand Equity Model for Tourism Destinations (Sweden)	Chekalina *et al*, 2014	Destination brand perception. Value-in- use and Value-for- money (Customers)	Quantitative	Web Survey	Proportional-stratified	Mono Method (SEM)
Creativity in tourism experiences (Sitges)	Binkhorst, 2007	Tourists' co-creation experiences (Tourists)	Quantitative	• Case Study • Survey	Simple random	Multi Method
Tourist systems co-creation exchanges. Governance for destination competitiveness	Ciasullo and Carrubbo, 2011	Stakeholders contribution to value co-creation (Firms)	Qualitative	• Multiple Case Studies • Survey	Purposive and relevant	Multi Method (triangulation)
Experience co-creation in tourism destinations (Naples)	Buonincontri *et al*, 2017	Consequences of experience and value co-creation (Tourists)	Quantitative	Survey	Non-probability (purposive)	Mono Method (SEM)
Unintentional coopetition in the service industries of tourism destination (Pyhä-Luosto – Finland)	Kylänen and Rusko, 2011.	Coopetition practices and processes in value co-creation (Firms)	Qualitative	• Case Study • Ethnography • Observation	Purposive and relevant	Multi Method (Thematic analysis)
The co-creation/place attachment nexus (Macao)	Suntikul and Jachna, 2016	Value co-creation and place attachment relationship (Tourists)	Quantitative	Survey	Simple Random	Mono Method
Consumer co-creation among destination marketing organizations	Tussyadiah and Zach, 2013	Social media strategy and capacity for value co-creation (DMOs)	Quantitative	Survey	Non-probability (purposive)	Mono Method (Factor analysis)
Experience Value Cocreation on Destination Online Platforms	Zhang *et al* 2017	Cognitive, emotional, and behavioural response to pre-travel online experiences (Users)	Mixed method	Scenario experiment and post experiment Survey	Convenience	Mono Method Sequential survey

(Adapted from Popesku, 2015:81-82)

5.2.1 Interpretive approach, inductive reasoning and the use of propositions

The influence of interpretivism on this study concerns the interpretations of knowledge-based value creation processes situated in the context of smart tourism destinations. This position recognises that the intersubjective nature of value creation and knowledge can only be understood through an ideographic approach to concepts and themes emerging from contextually embedded data and insightful meaning during investigation (Burrell and Morgan, 1979; Akaka and Parry, 2018). Researchers ascribing to this subjectivist approach are part of the phenomena being studied rather than neutral onlookers (Table 19). Hence, the role of the researcher-as-instrument in clarifying the boundaries of the phenomena being investigated (Lincoln and Guba, 1985; Pezalla *et al*, 2012) and establishing a dialog with key informants to collectively construct a meaningful reality (Crotty, 1998).

Table 19. Differences between the two modes of inquiry

Dimension of difference	Mode of inquiry	
	From the outside (Objectivist)	From the inside (Subjectivist)
Philosophical assumptions	Realism, positivism, determinism, nomothetic	Nominalism, anti-positivism, voluntarism, ideographic
Researcher's relationship to settings	Detachment, neutrality	"Being there", immersion
Validation basis	Measurement and logic	Experiential
Researcher's role	Onlooker	Actor
Aim of the inquiry	*A priori*	Interactively emergent *(a posteriori)*
Type of Knowledge acquired	Universality and generalisability	Situational relevance
Nature of data and meaning	Factual, context free	Interpreted, contextually, embedded

(Adapted from Evered and Louis, 1981:389; Burrell and Morgan, 1979:3)

By adopting the interpretivist philosophy, this research does not recognise the existence of an objective reality to be discovered or replicated. If reality depends on human actions, social or organisational context in which it is constructed (Walsham, 1993), then findings are generated by in-depth empirical examinations, and their interpretation is commonly based on an understanding 'how practices and meanings are formed and informed by the language and tacit norms shared by humans working towards some shared goal' (Orlikowski and Baroudi, 1991:14). In other words, social practices are embedded in the

language used to describe them and the researcher is part of what is being investigated. Considering the active role of the researcher (Section 5.2.4), the interpretive approach has implications for the reasoning adopted throughout the inquiry and the choices to be made upon the specific methods for the collection and analysis of data. Interpretive inquiries are characterised by inductive reasoning. Such reasoning defines studies that are exploratory by nature and less influenced by existing theories, views, and positions than those using deductive and abductive approaches (Onwuegbuzie and Leech, 2005; Creswell and Plano Clark, 2007; Veal, 2017). Deductive reasoning moves from a general theoretical level to certain specific conclusions by hypothesis and inferences about a population to confirm, reject or revise the theory (Hyde, 2000). Inductive reasoning starts from the observation of specific and/or relevant cases to build and/or refine the theories through in-depth data collection and the analysis of patterns of meaning (themes). Abductive reasoning adopts both inductive and deductive approaches for tentative conclusions generated from theory and empirical findings (Morgan, 2007). Among the main differences between the types of reasoning (Table 20), it is possible to identify the critical use of literature and its distinct role in the research process associated with the chosen methodology.

Table 20. Comparison of reasoning in research studies

	Inductive	Deductive	Abductive
Type of process	From specific instances to general	From general instances to specific	From specific instances among general instances
Approach to knowledge	Bottom-up (from observations)	Top-down (from theory)	Mid-range (from theory and observations)
Contribution to knowledge	Development and/or extension of theory	Testing theory through hypothesis	Best explanation across alternatives (hypotheses generation)
Nature of reality	Subjective multiple constructed realities	Objective single and measurable reality	Single reality and multiple realities
Philosophical stance	Interpretivism	Positivism	Critical realism (post-positivism)
Aim of the inquiry	Exploratory	Confirmatory	Tentative
Methodology	Qualitative	Quantitative	Qualitative and quantitative (mixed methods)
Use of literature	To define boundaries, purpose, and scope of the study	To introduce theory and inform hypotheses	To define boundaries, purpose, and scope of the study
Role of researcher	Actor	Onlooker	Actor or onlooker

Qualitative studies rely on 'insights and information coming from the existing literature as context knowledge' helping to develop the preliminary assumptions behind the research questions (Flick, 2014:66). An inductive reasoning entails an iterative and reflexive process (Section 7.2.4) refining and redefining questions and purpose of the study suggested by the literature. Conversely, quantitative researchers use the literature as a framework to derive hypothesis from theory by following a deductive reasoning process (Creswell and Plano Clark, 2007). Inductive reasoning is often associated with a theory-building process of qualitative research starting from observations, while a theory-testing process identifies deductive reasoning starting from generalisations or an established theory. With abductive reasoning, researchers 'use either a qualitative or quantitative approach to the literature' or a combination of both approaches, since they are not 'restricted to or associated with any particular methodology' (Lipscomb, 2012:244; Creswell, 2013:30). Apart from such a simplified classification of reasoning, there is no pure inductive logic excluding the use of extant literature and existing theories in qualitative studies. In the use of case studies, for instance, to develop or generalise theory, several authors (Eisenhardt 1989; Walsham, 1995; Yin, 2011) have recognised the role of *a priori* theoretical knowledge and constructs in shaping the research design and guiding the researcher's choices. This is clearly in contrast to the idea of the "blank slate" approach proposed by early advocates of the grounded theory approach (Glaser and Strauss, 1967; Urquhart and Fernandez, 2013) and used as an argument against scientific claims of qualitative research (Flick, 2014). Indeed, any qualitative research does not occur in a theoretical vacuum. The researcher, in fact, can use existing theoretical knowledge to develop a conceptual framework that represents the 'researcher's first cut at making some explicit theoretical statements' (Miles and Huberman 1994:91). The use of a framework helps researchers in their exploration of phenomena and interpretation of findings within specific boundaries and priorities (Yin, 2014). The crucial difference against quantitative research, therefor, lies in the ability to 'access existing knowledge of theory without being trapped in the view that it represents the final truth' (Walsham, 1995; Urquhart and Fernandez, 2013:227). This argument might also apply to qualitative studies using propositions derived from literature, rather than the interpretation of primary data and observations.

Misconceptions about such use of propositions may arise from the idea that theoretical propositions and hypothesis are the same thing or strongly related by the logical and

circular connection between qualitative and quantitative research. That is, propositions and theoretical constructs resulting from interpretive/inductive/qualitative investigations can be refined and converted into testable hypotheses in quantitative studies (Guba and Lincoln, 1994). While propositions are logic and theoretical statements concerning the relationship among concepts, hypotheses are specific measurable cases of propositions suitable for empirical testing (Reynolds, 2015). Given such higher order of abstraction of reality, propositions derived from the literature review should not be considered as equal as *a priori* hypotheses. In qualitative research, theoretical propositions are tentative and provide the researcher with direction and scope of the study as well as guidance for data collection, analysis, and discussion (Miles and Huberman, 1994; Baxter and Jack, 2008). The inclusion of propositions, alongside literature review and conceptual framework, has been widely stressed in case study research (Xiao and Smith, 2006; Eisenhardt and Graebner, 2007; Yin, 2014), in terms of analytical generalisation or theoretical contribution emerging from the interpretation of findings. In this study, they are preliminary statements relevant to research questions (Section 1.5) and aligned with the primary and secondary data collection instrument (Section 5.3.4). By comparing these early statements against the primary and secondary findings, the relevance and accuracy of propositions will be established for theoretical contribution made without quantification or causal account of the relationship between concepts.

The methodological approach of this study is, therefore, qualitative, process-oriented, contextual, and inductive. This choice considers the S-D logic "*pre-theory*" nature requiring an inductive approach to its advancement or development (Gummesson, 2006; Vargo and Lusch, 2017; Sangiorgi *et al*, 2019). The value co-creation processes being investigated occur in a new and complex socio-technological context, the smart tourism destinations, in which the use and influence of novel technology (smart ICTs) and inter-firms knowledge suggests an explorative and interpretive openness to field data and theories (Walsham, 1995; Buonincontri and Micera, 2016). 'The nature of interpretive research may or may not be qualitative, depending upon the underlying philosophical assumptions of the researcher' (Klein and Myers, 1999:69). Considering that all types of researches require an interpretation of findings (Gummesson, 2003), the epistemological stance of qualitative researches guides the methodology and methods more than ontology. Indeed, qualitative research can be driven by a positivist (Yin, 2014), interpretive (Walsham, 1993) or critical (Carr and Kemmis, 1986) epistemological approach. Given that value is socially constructed

(Peñaloza and Venkatesh, 2006), the relationship between actors aiming at value co-creation is more consistent with the interpretive paradigm than the radical humanist, functionalist, or radical structuralism paradigms (Burrell and Morgan, 1979).

5.2.2 Research philosophy

The most common arguments in favour of the previously proposed assumptions (Section 4.4.1) lie in the intrinsic difference between social and natural idealism phenomena and the collective creation of *Knowledge* of social constructivism (Berger and Luckmann, 1991). The dichotomy of natural and social phenomena itself imply a certain philosophical stance towards *Knowledge* and truth. Contrary to things in nature, humans make sense of the world they live through social interactions and shared interpretations. This position entails a holistic approach and *ex-post* reasoning which exclude the existence of a social world hard and concrete as the natural world (Burrell and Morgan, 1979). As such, 'social constructivism assumes that people collectively construct reality by their use of agreed and shared meaning communicated through language' (Berger and Luckmann, 1991; Galbin, 2014:84). Therefore, social meaning can be phenomenologically understood and dialogically interpreted (Schwandt, 2003). A relativist view of social reality that is coherent with S-D logic premises and value co-creation. Provided that value is socially constructed regardless of any actual exchange or use of services (Peñaloza and Venkatesh, 2006), the continuous and dialogical interaction between marketers and customers align more with an inter-subjective reality than a subjective or objective reality (Berger and Luckmann, 1991; Hollis, 1994).

With the considerable diffusion of smart ICTs and social media, marketers and consumers are jointly caught in "language games" (Wittgenstein, 2010) and it is increasingly 'difficult to separate objective reality from personal interpretation' (Palmer and Ponsonby, 2002:186). Hence, the focus of marketing research on meaning embedded in the use of signs, symbols and language as social practices, the active role of customers in the value creation process, which is by nature intersubjective (Prahalad and Ramaswamy, 2004). Although social constructivism appears to be highly complementary with S-D logic tenets (Edvardsson *et al*, 2011), epistemological "incongruities" may arise in the interpretivism position. Whereas interpretivists seek to understand subjectively experienced realities by using an objective view as instrumental utility, social constructivists focus on realities by

embracing an inter-subjective approach (e.g. the researcher-as-instrument) (Schwandt, 2003; Pezalla *et al*, 2012). This tension between the subjective-intersubjective realities and objective interpretations should be considered when deploying a research strategy for this study. Value co-creation processes rely on the integration of resources and exchanges (Vargo and Lusch, 2004), which can be interpreted either as combined or separated activities. When combined, they are inter-subjectively oriented, while separated the integration of resources is subjective (Löbler, 2011). Given that the exchange for resource integration is intersubjective, then the knowledge enabling resource integration is also intersubjective. Bearing in mind the limitations of the analytic-synthetic distinction upon truth (Russell, 2007), this analytical reasoning leads to the idea of knowledge as a social construct. Viewed in this way, both interpretivist and social constructivist epistemologies can be adopted to understand the meaning that constitute knowledge as social actions and knowledge as multiple realities interpreted through shared social practices, symbols, and language (Schwandt, 2003). Learning is clearly entwined with knowledge, at individual and collective level. Since the creative and collective construction of knowledge precedes individual's consciousness (Spender, 1996b), the development of situated knowledge based on social practices neutralises the learning-knowledge distinction (Chiva and Alegre, 2005; Castaneda *et al*, 2018).

Therefore, knowledge is not necessarily the goal of learning. Claiming that knowledge is held intersubjectively by organisations or groups of people does not denies 'the fact that we can know more than we can tell' (Polanyi, 1967:4), but affirms that knowledge depends on the context and it is constantly created through relational social practices embedded in language (Brown and Duguid, 2001; Gergen, 2001). An epistemology of process (*knowing*) that is in line with the social constructivist epistemological dimension of value co-creation. Hence, in the context of this study, value creation and knowledge can be both understood as socially constructed entities against other idealist and realist philosophical positions. In accordance with the two opposing perspectives framed by Burrell and Morgan (1979) and Tadajewski (2004), value creation and value can be accordingly deemed as intersubjective and subjective entities. The adoption of a realist stance implies an objective approach to Knowledge that is inconsistent with the social nature of value. As Clark (1995:36) states, 'the lack of any satisfactory theory of value from both of the two main traditions (objective/subjective) come from the illegitimacy of treating social phenomena as it were

natural'. Although cognitive and behavioural theories allow rational deductive reasoning about the subjective nature of value (Simon, 1991), this approach to *Knowledge* would be limited by the exclusion of the social dimension. Similarly, a strong emphasis on the personal experience of value creation, typical of radical constructivists, can result in an understanding of reality trapped in a sort of psychological solipsism. Given that value co-creation, in S-D logic, presents ontological incongruities between the 'positivist gain of value by all actors involved' and its phenomenological nature (Hilton *et al*, 2012:1508), critical realism might seem suitable to understand such a complex phenomenon beyond the objective-subjective continuum (Peters *et al*, 2014). Arguably, value does not exist as objective reality as critical realists would advocate. For radical constructivists, what is taken to be real (i.e. value) is a process developing 'in the head' (Glasersfeld, 1984; Gergen, 1999:237), while critical realists accept the existence of different subjective value outcome resulting from service provider and customers interactions (Hilton *et al*, 2012). Besides, the notion of value embedded in goods and services entails a realist orientation simplifying the complexity of the intersubjective nature of service exchanges through the use of the *value in exchange* concept. The intrinsic value of an object or a service can arguably be independent from the context and from one's consciousness, until an abstract or actual relationship comes into play and/or exchange takes place at a price (Sen, 1997; Zuniga, 1999).

Social constructivism is, conversely, consistent with the contextual and collective shared meaning of value and value co-creation regardless of whatsoever ontological assumption. Being 'mute or agnostic on matters of ontology' (Schwandt, 2003:198), however, does not prevent social constructivism from some substantial limitations. As long as the value is phenomenologically determined by the beneficiary of the exchange (Vargo and Lusch, 2004), it might be difficult to interpret value co-creation by assuming that experience is embedded in language because all the other means of proposition are clearly excluded. Furthermore, excessive attention to context, cultural and social phenomena has the risk of limiting individuals' cognitive and creative endeavours in the social construction of value through direct and personal interactions. This also leads to the problem of justifying the multiple interpretations of reality, including the researcher's view, on the grounds that a definitive interpretation cannot be yielded by fixed criteria of analysis or any appeal to empirical evidence (Gadamer, 1989). Hence, the distinction between the idea of holism

and its practical application. Considering that interpretivism is essentially about method, like positivism, the interpretive flexibility of social constructivism allows mitigation of these limitations by using different research methods of inquiry. In its reference to knowledge and skills as determinant of value creation and competitive advantage (Vargo and Lusch, 2004; 2008a; 2017), S-D logic raises additional ontological and epistemological issues. The excessive focus on knowledge as a process (*knowing*) has led to an epistemology of possession and to an understanding of knowledge (*expertise*) as a physical resource, rather than a complex and abstract entity. Individuals and organisations that own, trade, store, manage and apply knowledge take for granted the complete or partial association of "*justified true belief*" with the representation of reality of natural science (Spender, 2008). The knowable reality "out there" can be assumed by comparing representations and testing hypothesis. "*Knowing how*" and "*knowing that*" imply the capability to claim "true" knowledge out of "false" knowledge. Companies with a *justified true belief* about the intentions and behaviour of customers hold an advantage over other organisations in co-creating value, while consumers with that knowledge about services can make better decisions against the different value propositions to gain better value. A materialist and determinist view are consistent with positivism. Since individuals' rationality is bounded by the amount of information they have and/or share (Simon, 1991), such an "objective" knowledge can be seen as aggregated information concerted into actionable instructions (Ackoff, 1989). This "*knowing*" for "*knowledge*" substitution, however, does not consider the creative uncertainty of individuals, which is commonly resolved through the collective exchanges of ideas and practices.

Serendipity can also be considered, here. Practical knowledge cannot be bounded by the context in which takes place, whether an organisation or a destination, and we can only interpret different phenomenological meanings to propose a partial understanding of truth. At individual level, tacit knowledge concerns the cognitive realm of mind and "no man is an island". Any tacit to explicit knowledge translation attempt through empirical reasoning is 'at best comparing representations' (Spender, 2008:162). Crediting individual and collective knowledge, and its meaning, as objective reality can certainly help rational observation of reality through a determinist and materialist approach. With this in mind, it is hard to believe that practical knowledge comes from an *a priori* truth, at least in a social context of inquiry. As such, this research recognises that value, value creation and

knowledge can be better understood as socially constructed entities in the interpretivist perspective, than idealist and realist philosophical positions.

5.2.3 The role of the literature

The use of literature varies significantly in qualitative inquiries, with different roles and functions (Creswell, 2013). For studies developing theory, a review of the literature has been often recognised as inconsistent with an inductive approach or just for comparison with extant knowledge and findings from the field. This view is typical of earlier positions towards theory building methods (Glaser and Strauss, 1967) and has been extended to any qualitative exploratory study that should basically listen 'to participants and build an understanding based on what is heard' (Creswell, 2013:29). Hence, misunderstandings about the role of literature and the 'fear of invalidating one's own work by violating the principles of induction' (Morse, 2002:295). Through different research methods, several authors (Eisenhardt and Graebner, 2007; O'Reilly, 2012; Yin, 2014) have addressed this issue by arguing that incorporating literature in qualitative studies helps to contextualise the topic and findings as well as improve the methodology and quality of the inquiry. In this study, the literature has the dual purpose of providing the reader with an exhaustive introduction to the study and the researcher with guidance during the entire research process. The researcher has used the literature to choose the topic, identify the research problem and define the research questions, along with the research approach and design (Myers, 2013).

In an iterative dialogue with primary findings, the significance of this study and its quality is situated in the interconnection between the literature review, research questions and research design. Conceptual propositions as well as main assumptions (Sections 4 and 4.4. 1) informed by the literature review, and the research questions (Section 1.5), provide the basis for the theoretical coding developed in the initial phase of thematic analysis (Section 5.4.3). Given the interpretive and inductive approach of this study, analysis of data is not confined to an *a priori* coding, and methodological literature will be used to explore and interpret any relevant concept and theme generated from the collection of primary and secondary data (Eisenhardt and Graebner, 2007; Silverman, 2013). The comparison and contrast of themes and concepts against those found in the extant literature will enable the identification of patterns and thereby the contribution of this study. In fact, the lack of a contribution to knowledge hinges on an 'inadequate' literature review or not 'sufficiently

up to date' (Myers, 2013:240). Thus, the researcher deals with pre-existing knowledge and its integration in empirical data by using pre-existing data and information (secondary data and the literature) in a more flexible and detached way than those quantitative or mixed-methods studies based upon a deductive approach.

5.2.4 The active and reflexive role of the researcher

In contrast to quantitative approaches, the qualitative research methodology entails the active role of the researcher throughout the entire investigation. An element of distinction between the researcher as onlooker or actor pertains the notion and use of the research tools as well as the relationship with participant. With an objective approach to inquiry, quantitative researchers build the research instruments as separated from both him/her and the "object" being investigated. The researcher-participant relationship is very limited and standardised, with participants (ideally) acting independently of researcher (Creswell, 2013), whereas the interpretive qualitative studies researcher 'can never assume a value-neutral stance' (Orlikowski and Baroudi, 1991:16). Qualitative researchers become the instrument of primary data collection and analysis by setting up dialogical interactions with participants and data (Lincoln and Guba, 1985; Patton, 2002). At different degrees of involvement, from observation to the actual participation in the daily life of informants (Blaikie, 2007), the researcher enters the world of participants by acting as a learner that facilitate participants disclosure, rather than expert imposing discourse and/or narrative (Marshall and Rossman, 2011; Pezalla *et al*, 2012).

Hence, the constant negotiation of the researcher-participant boundaries to allow the generation of relevant information and insights with limited intervention. Being involved in the construction of ideas and meaning requires an active response to such challenges in the form of self-reflexivity (Janesick, 2001; Pezzalla *et al*, 2012). To be capable of placing themselves as social actors within the context of the inquiry, and achieve a certain level of objectivity, is a challenging endeavour for qualitative researchers dealing with the role of 'detached and empathetic observer' (Blaikie, 2009:50-51), with impact on the "scientific validity" of the findings (Section 5.5). Data collection, analysis and interpretation present the same complexities. As recognised by Merriam (1998:7), 'data are mediated through this human instrument, the researcher, rather than through some inanimate inventory, questionnaire, or computer'. Since data collection, analysis and interpretation are not

viewed as discrete steps (Myers, 2013), the researcher constantly moves between theory, data, and the research questions through an iterative and reflexive reasoning (Gergen and Gergen, 1991). By doing so, the researcher can better understand his/her position in the context of the inquiry and the role of both theoretical and practical knowledge in relation to the data collection and analysis (Strauss and Corbin, 1990). Such theoretical sensitivity is peculiar to qualitative researchers and their ability to look at data afresh and interpret them without any preconception (Walsham, 1995). Strauss and Corbin (1990:42) refer to theoretical sensitivity as 'a personal quality of the researcher' and the 'attribute of having insight, the ability to give meaning to data, the capacity to understand, and capability to separate the pertinent from that which isn't'. In a similar way, Yin (2014) emphasises the researchers' skills and expertise to deploy a solid design that should be based on highly structured procedures and the ability to recognise when a different orientation of the case study emerges and a new research design have to be implemented.

The author, in this study, adopts the approach of the learner on the ground of his limited theoretical knowledge of the recent smart tourism phenomenon and the lack of practical knowledge in the tourism industry. Alongside the extensive professional experience in the telecom industry as strategic marketing manager, the academic background in tourism and travel business studies have influenced the choice of the topic and the qualitative research approach. Furthermore, the author's status of novice researcher and the emergence of smart tourism application to the urban context underpin the explorative stance adopted. Such subjective and theoretical intent presents implications for any decision taken upon all aspects of the research, including the choice of methodology and method (Mackenzie and Knipe, 2006). Given the use of the case study and semi-structured interviews, the role of the author is arguably more of a detached observer than that of an insider viewer relying on fieldwork or observation-based approaches. However, this position does not apply to the empathetic interpretation adopted for the construction of meaning grounded in the data. Hence, the choice of single-case study as the qualitative research method combining flexibility and a structured strategy to produce reliable knowledge.

5.3 Qualitative research strategy: case study

The strategy guiding the collection and analysis of data is crucial to any research inquiry, in particular qualitative ones. It is increasingly hard to find pure qualitative strategies. As Denzin and Lincoln (2008:8) observe, the researcher combines materials, techniques and

strategies using 'an interactive process shaped by his/her personal history, biography, gender, social class, race, and ethnicity, and those of the people in the setting'. Such a dynamic process calls attention to the significance of research design with reference to the methodological adequacy and consistency across the entire process of inquiry (Lincoln and Cuba, 1985; Bergman and Coxon, 2005). The field of study and the researcher's personal interest and attributes guide the choice of an appropriate strategy (Myers, 2013). In view of the overall methodological stance discussed (Section 5.2), the single-case study strategy is the research approach adopted by this study. In this section and sub-sections, the single-case study strategy will be discussed in terms of its salience to address the value creation in smart destinations phenomenon and the research design.

Case study has been increasingly popular in qualitative researches because of its flexibility in terms of research paradigm, the type of research questions that can be answered and data gathering options as well as the ability to test or develop theory (Eisenhardt 1989; Yin, 2014). According to Yin (2014), case study is suitable to answer *why* and *how* questions about contemporary, complex and/or dynamic phenomena over which the researcher has little or no control of behavioural events. In this respect, case study maintains the logic of an experimental research design based upon tight guidelines procedure and theoretical background (Eisenhardt, 1989). The phenomena investigated in each case (experiment) occur in the rich, real-life context with boundaries that are not clearly defined, rather than isolated from their context (Eisenhardt and Graebner, 2007; Yin, 2014). As such, case study approaches can adopt a social constructivist view (Stake, 1995) or a positivist viewpoint (Eisenhardt 1989; Yin, 2014). The former pays more attention to the bounded context of cases and the flexibility of the research design, while the latter highly rely on prior and established theoretical propositions as well as the structured design process. In particular, the Stakian perspective sees cases and case studies as objects embedded in a bounded system, rather than a process. Even if this view shares the holistic approach proposed by Yin, as Stake (1995:2) notes, it is more apt to study 'people and programs' and less suited for 'process and events.' Although the methodological position and the research strategy of this study has been clearly influenced by the social constructivist epistemology, the Yinian structured view of the case study method appears to be more beneficial to explore the process of value creation as a contemporary phenomenon occurring in the emerging context of smart destinations. This approach has been extensively adopted in tourism

research (Xiao and Smith, 2006) and, specifically, in smart tourism studies (Mehraliyev *et al*, 2020; Ye *et al*, 2020).

The use of an initial theoretical perspective can help the researcher investigating a new phenomenon (i.e. value creation in smart destinations) to implement a case study aiming at challenging, extending, or building this perspective. Yin (2011:9) contend that the theory complements the development of all methodological steps and 'should by no means be considered with the formality of grand theory in social science but mainly needs to suggest a simple set of relationships' between concepts, structures and events. Building on this, Eisenhardt (1989) moves towards a theory-building approach that lies in-between Yin's position and grounded theory. The earlier findings are validated from a case in a new case setting (*replication logic*) through an iterative process in which each case is an analytic unit associated with the context (Eisenhardt and Graebner, 2007). Otherwise, Stake (1995) stresses the inductive approach to case study on the ground of their interpretive position. The combined use of various data collection techniques is recognised as a strength of the method by all scholars and practitioners (Myers, 2013). The adoption of multiple sources of evidence and methods, for triangulation purposes, enhances the overall quality of case study (Yin, 2014), regardless of the number of cases (Flick, 2008; Myers, 2013). Case study can extensively rely on interviews, archival data, survey, ethnographies, and observations, with qualitative and quantitative sources equally instrumental (Yin, 2014). It is commonly agreed (Eisenhardt, 1989; Stake, 1995; Patton, 2002; Yin, 2014) that the use of different data sources provides a comprehensive picture of complex phenomena in their context and, thereby, increases validity and reliability during analysis. Nevertheless, this can easily result in a time-consuming and expensive inquiry, with a large amount of data hard to handle and difficult to analyse. Hence, case studies in business and management are mostly cross-sectional investigations based on 'empirical evidences from interviews and documents' (Myers, 2013:78). This study aligns with such a complementary data collection strategy (Section 5.3.4.3) within a single-case study design.

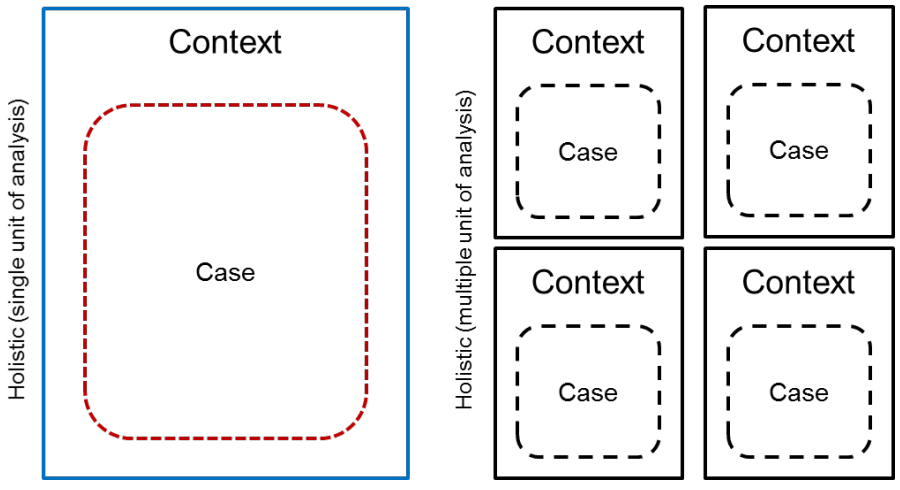
Considering the strengths and weaknesses of the different types of case study proposed by Yin (2014), the single-case study design has been recognised as suitable to investigate a phenomenon (value creation) occurring in a unique and/or new context (smart tourism ecosystem), with boundaries between them that are not clearly defined, and through a congruous philosophical view (social constructivism). Since research in this field of tourism

is still in its early and formative stage (Benbasat *et al*, 1987; Ye *et al*, 2020), and its rarity from supplier's perspective (Mehraliyev *et al*, 2020), this type of approach appears to be suitable to expand the theory and determine alternative relevant set of explanation (Yin, 2014). With specific reference to the single-case study, the purpose to expand or generate theory for generalisation (Section 5.3.3) have to be clarified to sustain the exploratory role of the research (Yin, 2014).

5.3.1 Salience and suitability of single-case approach to this study

The purpose of the research, the type of question(s) and the degree of control over the case guide the choice of cases design (Yin, 2014). With the S-D logic theoretical orientation shifting the focus from goods and service to value co-creation as 'core purpose and central process of economic exchange' (Vargo *et al*, 2008a:145), the application of this view to the context of smart tourism destinations requires a holistic case study approach, rather than an embedded design based on more than one subunit of analysis, like groups of employees within an organisation being studied (Yin, 2014). The difference between a holistic multiple case and single case respectively lies in the analysis of several cases within their own context and across contexts or a unique case within a single context (Figure 23). Whereas multiple-case study increases the methodological rigour by collecting data and comparing them across cases in different settings (Yin, 2014), the single-case design provides enriched description and understanding of unique and extreme phenomena (Walsham, 1995).

Figure 23. Holistic single-case study design vs multiple-case study design



(Adapted from Yin, 2014:50)

The main issues concerning any case study design lie with the strengths and weaknesses of the chosen design (Campbell, 1961; Gummesson, 1991; Yin, 2011). The ability to provide comparison between cases through cross-case analysis is a major strength of multiple-case study and concurrently a weakness. If transferability of findings from one case to another is possible through the *thick descriptions* of the cases (Guba and Lincoln, 1989), then time-constrained and resources-constrained limitations may also arise in multiple-case design (Eisenhardt and Graebner, 2007). Single-case study instead entails attention to the context and provides a holistic, empirically rich understanding of phenomena in a unique and/or extreme setting (Yin, 2014). In line with the aim and objectives of this research, the single-case design can be recognised as the appropriate approach to provide an overarching and rich understanding of value creation in smart destinations. The suitability and significance of this specific research strategy will be discussed hereafter.

The value creation process being investigated within the smart Corridor context (Section 4.5) can be defined as a unique phenomenon occurring in the unique environment of smart tourism ecosystems. This is essentially based on the fact that tourist destinations rely on their distinctive elements of attraction and their own interconnected network of actors creating tourist services and goods through the co-creation of value (Park and Vargo, 2012; Cabiddu *et al*, 2013; Pellicano *et al*, 2018). The value co-creation process embedded in the smart tourism ecosystem is entwined with the context of the Corridor. It is also unique because the characteristics of each tourist destination and their ways of co-creating value cannot be easily replicated or imitated, including the use of smart ICTs and data.

This research aims at understanding value creation process in a smart tourism destination by exploring the role and influence of its main components (data, information, smart ICTs, and knowledge). Given the nature of this study, the chosen single-case strategy presents an explorative and descriptive power to address the phenomenon being investigated and resolve its contextual complexity, alongside the overall capacity to advance or revise the theories. Also, the identification of Manchester as the single "case" for value creation in a smart tourism ecosystem allows the researcher to frame the boundaries for this empirical investigation and distinguish crucial events from less relevant ones (Stake, 1995; Flyvbjerg, 2011). As a smart "bounded system" or "bounded ecosystem" (Smith, 1978), Manchester can be defined as a "newly" real-life context (Yin, 2014). As such, the single-case strategy enables the investigation of the socially constructed "reality" of the value creation process

occurring in the “natural” smart environment of the city, particularly in the case of blurred context-phenomenon boundaries.

There has been criticism towards the problematic interpretation of results and potential abstractness risks leading to a lower external validity (Campbell, 1961; Stake, 1995), since replication logic and cross-case analysis are not applicable (Tellis, 1997). These critiques have been mainly rejected on the ground of the limited view of case study from the logic underpinning natural science, its use for specific case and the strength of the argument to support it (Yin, 1981; Flyvbjerg, 2006). Single-case strategies, according to Yin (2011), are suitable for cases being representative, revelatory, typical, unique and/or longitudinal. Drawing upon such premises, the single-case approach is suitable to explore and expand the underpinning theories and determine an alternative relevant set of explanation when all the suggested conditions to the use of the case study approach are met.

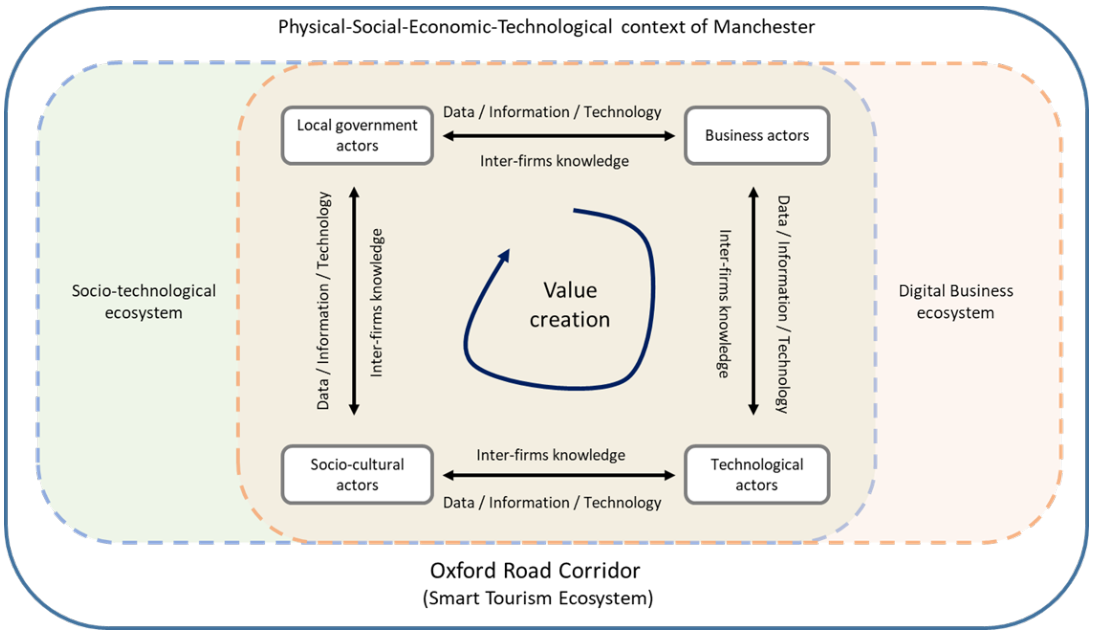
The single-case design is appropriate for this study under three of the five circumstances identified by Yin (2014). This qualitative-interpretative research, in fact, considers a single unit of analysis (the single- case) identified as the smart tourism destination, different units of data collection (actors) co-creating value within a real-life and new environment (smart tourism ecosystem). A single-case design (holistic) can therefore be used to explore value creation as a process based on the interpretation of inter-firms socially based knowledge practices across different smart destination actors.

Even if the multiple-case design can actually provide robustness of findings and a stronger base for analytic generalisation than single-case study (Eisenhardt, 1989), analysing within-case and cross-case data can be expensive and time-consuming to implements (Yin, 2014). This applies to the embedded single-case design, too. As Yin (2014:57) observes, additional sub-units of analysis increase complexity and drain attention from the holistic nature of the research. A major hurdle, in this regard, can arise as the researcher fails to move back to main research issues from the analysis of sub-units (Baxter and Jack, 2008). However, any shift of orientation during the study should be reflected in a new research design, from holistic to embedded cases or from single to multiple cases. To mitigate bias and analytical risks, as suggested by Yin (2014), the researcher’s skills and capabilities play a significant role (Section 5.2.4).

5.3.2 Unit of analysis

A unit of analysis is the major entity (the who or what) being analysed in a study. It can be different from the unit(s) of data collection and might refer to individuals, contextualised group of people (e.g. community, organisation) or a real-life phenomenon (e.g. inter-firm relationships). Patton (2002) and Yin (2014) agree upon the association of the case with the unit of analysis, which circumscribe the case itself and separate it from its context (Yin, 2014). As guided by the research questions (Section 1.5) and informed by the preliminary conceptual frameworks (Section 4.4), as well as the identification of the context (Section 4.5), the unit of analysis of this study is the value that can be created through the exchange and application of inter-organisational knowledge, data, information and ICTs across the relevant actors operating in the smart Corridor of Manchester (Figure 24).

Figure 24. Unit of analysis

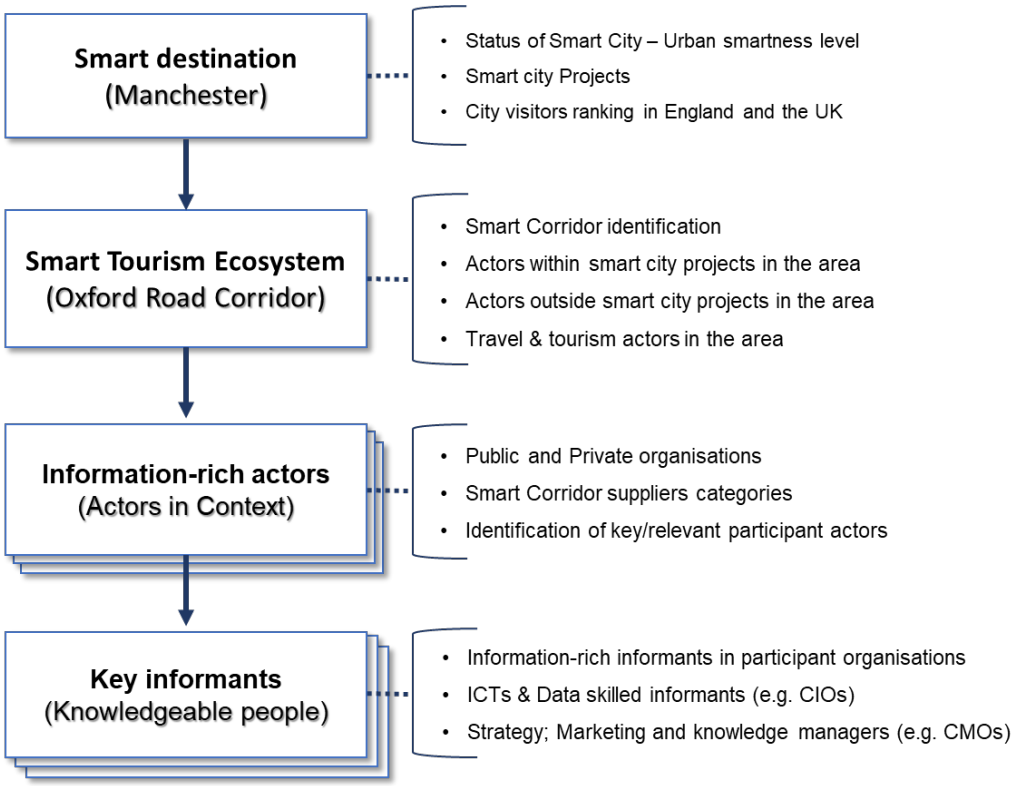


5.3.3 Theoretical sampling strategy

The sampling strategy is less prescriptive and rigid in qualitative than quantitative studies. This is inferred by the purposeful nature of qualitative research (Patton, 2002; Flick, 2008), which cannot be associated to the sampling procedures prescribed by quantitative studies and statistical generalisation (Myers, 2013). The meaningful participants and informants are selected for theoretical reasons, in line with the purpose of the study, and not as the sampling units of a statistical population (Eisenhardt, 1989; Yin, 2014). The randomisation

approach is not appropriate 'because knowledge of a topic is not randomly distributed in the population' (Morse, 2003:95). To explore a phenomenon, the qualitative research strategies require openness and flexibility in selecting the information needed through a suitable method (Glaser and Strauss, 1967; Lincoln and Guba, 1985; Veal, 2017). This flexibility should not be interpreted in terms of poor significance or lack of quality of the findings, when the researcher clearly defines the relevant criteria of inclusion or exclusion of participants according to theoretical underpinnings and research questions (Bryman, 2015). As contended by Patton (2002:203), the strength of purposeful sampling 'lies in selecting information-rich cases for study in depth. Information-rich cases are those from which one can learn a great deal about issues of central importance to the purpose of the inquiry [and they] yields insights and in-depth understanding rather than empirical generalizations.' In other words, in-depth understanding in qualitative studies can only be achieved through the selection of the relevant informants fulfilling the aim and objectives of the enquiry. In this study, the theoretical sampling strategy concerns the selection of Manchester as smart destination and the identification of the Oxford Road Corridor as the smart ecosystem context within which actors (potential participants and key informants) operate and co-create value (Figure 25).

Figure 25. Theoretical sampling strategy



To analyse value creation in a smart tourism destination, this study adopts the purposeful intensity sampling strategy. This kind of technique involves the selection of 'information-rich cases that manifest the phenomenon of interest [value creation] intensely (but not extremely) […] rich examples of the phenomenon, but not highly unusual cases (Patton, 2002:234). Following this logic, Manchester was selected as the smart tourism destination, within which the value creation process was analysed, on the ground of the growing focus of the city on the implementation of smartness through smart city policies (Appendix 5), projects and initiatives (Appendix 6). As stated in Section 4.5.1, the smartness of the city is still at the initial phase of its effective implementation, despite the recognised status of smart city. In this respect, the sampling strategies for this study and all related decisions were carried out between the end of 2016 and 2017, at a time when the SmartImpact and CityVerve projects were set out as part of the "Smarter City programme". In Manchester, the Oxford Road Corridor was identified as the smart environment within which the value co-creation process (i.e. phenomenon being investigated) intensely manifest (Section 4.5) through resourcing, exchanges and interactions taking place among the organisations operating in the Corridor. The criteria to select the relevant organisations as participants to the study, and thereby the key knowledgeable informants in them, was informed by the literature together with the analysis conducted to identify the Corridor as smart tourism ecosystem (Section 4.5.1). Further, the relevant participants (organisations) were selected without any attempt to find representativeness for generalisation (Miles and Huberman 1994). Considering the complexity of smart tourism ecosystems (Gelter, 2018), it is difficult to segment all industries/sectors and incorporate organisations within them using the conventional business-centric classification of tourist destination, on the ground of the fluid and blurred roles of the different actors (Femenia-Serra *et al*, 2019). According to Gretzel *et al* (2015b:560), the STE actors can be classified as 'touristic and residential consumers, tourism suppliers, tourism intermediaries (travel operators), support services (telecommunications and banking services), platforms and media (Facebook, TripAdvisor, Airbnb), regulatory bodies and NGOs, transportation carriers, travel technology and data companies (Amadeus, Sabre), consulting services, touristic and residential infrastructure (pools, parks, museums) and companies typically assigned to other industries (medical services, retailing)'. As regards the sampling criteria, Table 21 outlines the contacted and selected participants and the respective key informants identified as highly knowledgeable people. In line with the different organisations identified within the Oxford Road Corridor

(Section 4.5), the participant actors (public and private organisations) were selected as representative of the smart Corridor according to the simplified classification of their role, adopted to reduce the aforementioned complexity.

Table 21. Contacted participants and potential key informants

Participants (organisations)		**Key informants** (knowledgeable people)	
Role(s)	**Industry**	**Role(s)**	**Criteria**
Knowledge	Education	Knowledge officer	Knowledge transfer and exchange Expertise
Knowledge	Education	Knowledge officer	Knowledge transfer and exchange Expertise
Administration	Government	Smart city officer	Smart city policies and programmes expertise
Socio-cultural, Data	Culture and Media	Digital marketing officer	Socio-cultural, data and management knowledge
Business & Data	Retail consulting	Managing director	Hight Street data management expertise
Socio-cultural, Smart ICTs	Culture and ICTs	Innovation manager	Socio-cultural innovations through smart ICTs expertise
Smart ICTs	ICTs	Chief Marketing officer	Smart ICTs practical knowledge
Smart ICTs, Data	ICTs	Data Manager, Digital Marketing Officer	Big data and Smart ICTs solutions expertise
Smart ICTs, Data	ICTs	Data Manager, Digital Marketing Officer	Big data and Smart ICTs solutions expertise
Digital, Smart ICTs	ICTs	Digital Marketing Officer	Smart ICTs solutions expertise
Digital, Culture, Smart ICTs	ICTs	Marketing manager	Knowledge of Digital/Cultural solutions through smart ICTs
Business	Tourism	Chief Marketing Officer	Online travel services expertise (consumers)
Business	Tourism	Marketing officer	Online travel services expertise (Business)
Digital, Social, Business	Tourism	Head of Digital	Destination Marketing expertise
Business	Tourism	Marketing Manager	Hospitality services expertise
Business	Tourism	Marketing Manager	Hospitality services expertise
Business	Tourism	Marketing Manager	Hospitality services expertise
Business	Tourism	Marketing Manager	Hospitality services expertise
Business	Tourism	Marketing Manager	Hospitality services expertise
Socio-cultural, Data	Tourism	Data manager	Socio-cultural data management expertise
Services	Transport	Data manager	Travellers (visitors/residents) data management knowledge
Services	Transport	Data manager	Travellers (visitors/residents) data management knowledge
Smart ICTs	ICTs	Head of Innovation	IoT practical knowledge
Socio-cultural, Business	Tourism	Head of Marketing	Socio-cultural and creative services management expertise
Business, Data	Consulting	Senior Marketing Consultant	Cultural and creative data management expertise

The criteria guiding the selection of the organisations and the respective knowledgeable people were informed by the literature defining the smart Corridor and the contribution of organisations to the qualification of the area as smart environment. The participant organisations were classified in terms of their business; socio-cultural; data; knowledge; and administrative activities, either at individual or combined level. Some of the selected participants were involved in one or more smart city projects, but this was not considered as essential to the choices being made for public and private organisations inclusion. Still, smart projects participations were deemed as indicative of potential information-rich actors, because of the practical knowledge gained in managing data and information and developing smart solutions or services. Despite the simplified classification adopted, the identification of potential participants was conducted through the traditional socio-demographic scouting and benchmarking of organisations (i.e. type of business, size and role inside or outside the Corridor), including the digital footprint of the organisation on the web and social media and the adoption of smart ICTs. Even if this research adopts a supply-side viewpoint, the contribution of selected organisation to the smart Corridor and their potential participation to this study was also considered in terms of, but not limited by, service provisioning and engagement with residents/tourists.

The above sampling criteria was not used to identify the key informants within the selected participant organisations. Given that information-rich cases are essential to examine the phenomenon of interest (value creation), knowledgeable people in each organisation were recognised as the key informants in terms of their expertise of smart ICTs solutions, data management and knowledge transfer concerning the different cultural, social and digital industries characterising the Corridor. In particular, data managers, innovation managers, marketing managers or officers, and other similar roles with diverse levels of digital know-how, were identified as the skilled experts to gain rich information about data (operand resource), smart ICTs (operand/operand resource) and valuable insights about knowledge exchange and integration (operant resource) for value creation.

5.3.4 Data collection

The data collection strategy was informed by the research question(s), research objectives and qualitative methodology of this study. Primary and secondary data were respectively generated from the semi-structured interviews carried out with the knowledgeable people

identified within the actual participant organisations and diverse existing online material, such as social media conversations, smart city projects records and official publications of the smart Corridor. Following the sampling criteria for the selection of participants and the key informants, 11 interviews were collected between March 2018 and May 2019. Within a larger timeframe (December 2016 - September 2019), secondary data about the Corridor and smart city initiatives, in the form of podcasts or documents, were also collected and transcribed when appropriate.

Table 22. Data collection strategy

Who? / What?	How?	When?	Why?
Primary data (Interviews)			
11 interviews (total): 4 data managers. 7 marketing managers, including digital & innovation managers	Semi-structured interviews. 2 (Data & Marketing managers) distinct and correlated interview guides. Duration: 30 minutes average	Feb. 2018 May 2019	Gain rich understanding of the value creation process through its key components (Data, ICTs, knowledge & skills)
Secondary data (online documentary material)			
Public consultation reports; Podcasts; Maps; Newspapers; Social Media posts; Websites; Press releases; Images	Download of online written material (Reports, News; Statements, Maps, Images). Social Media posts gathered by NCapture (NVivo). Non-written material (podcast) transcriptions	Dec. 2016 Sept. 2019	Smart Corridor definition. Participants sampling. Complementary understanding/analysis of the value creation process

As discussed later (Section 5.4), the analysis of collected interviews allowed the researcher to explore the value creation process in the smart tourism ecosystem through its crucial components, while the collected secondary data offered a complementary perspective on value creation by the analysis of documentary material to expand and/or integrate the primary findings. The overall data collection strategy outlined in Table 22 will be hereafter critically discussed in detail.

5.3.4.1 Semi-structured Interviews

As qualitative data collection method, interviews are the pivotal source of 'rich data about people in different roles and situations' within the context being investigated (Myers, 2013:119). Semi-structured interviews with key informants were conducted to generate themes through their analysis and interpretation (Section 5.4). The aim of the interviews concerned the collection of rich information about the significant components of the value

creation process, particularly inter-organisational knowledge, smart ICTs, and data. After selecting participants (organisations) (Section 5.3.3), the data collection process focused on identifying and gaining access of respective key informants (Section 5.3.4.2). Face-to-face interviews were conducted separately and at a different time to avoid any potential bias towards homogenous view of the phenomenon of interest (value co- creation) and its building blocks. Before starting every interview, the information sheet (Appendix 7) and the consent form (Appendix 8) were provided to be signed by each and all interviewees. Interviews were audio recorded, transcribed, and treated according to the academic ethical guidelines on personal and sensitive data.

Rationale, design, and structure of interviews

Collecting data through interviews entails a person (the interviewer) asking questions to another person (the respondent), either by telephone, web or face-to-face. Interviews can essentially be distinguished between structured, semi-structured and unstructured (Flick, 2014; Bryman, 2015). Structured interviews involve preordered and predefined questions in the form of a questionnaire with specific categories and limited time of response. Such organised interviews are commonly associated with quantitative methods in relation to the limited freedom entitled to the researchers and participants. Conversely, unstructured interviews are characterised by their informal and conversational approach. This kind of interviews rely on non-standardised, undetermined open-ended questions and responses to let themes "emerge" from more or less guided conversations, without *a priori* questions and categories or time constraints. Given the natural flow of interactions and spontaneous narratives, they tend to be part or extension of interpretive/inductive fieldworks based on participant observation, like ethnography (Patton, 2002). The choice of semi-structured interviews for this study was informed by the research questions (section 1.5), theoretical propositions and the preliminary conceptual frameworks (Section 4.4). Semi-structured interviews combine the administration of pre-formulated open questions with questions arising from the conversation with the interviewee. These interviews try to 'take the best of both approaches, while minimizing the risk' (Myers, 2013:123), by combining structure and some improvisation during the conversation to obtain important insights. As such, the control over the interview and topics by the researcher is higher in structured interviews and less in unstructured ones. With semi-structured interviews, the researcher is required to encourage interviewee in a conversation, including additional questions to be asked to

expand on a potential significant aspect that might emerge in the talk and/or requesting to respondent an explanation to their answers. Semi-structured interviews are well-suited and adopted in qualitative studies (Mason, 2017), and particularly case study (Hancock and Algozzine, 2016), for several interconnected reasons. First, the flexibility of the format and the freedom of ordering topics and wording in advance, which results in considerable time saving. Second, the relative openness of semi-structured interview protocol provides the researcher the opportunity to change the line of questions or add new questions to explore further themes or answers offered by interviewees. Third, meanings and understandings of themes result from the interactional dialogue between researchers and interviewees. Finally, the semi-structured interviews can be used in case of considerable variations of information collected from each interviewee may occur. These features are consistent with the qualitative-interpretive nature of this study and the socially constructed approach to value creation process in smart tourism destinations and its different dimensions. They are, in fact, the 'most appropriate when the interviewer is closely involved with the research process (e.g. a small-scale research when the researcher is also the interviewer)' (Robson and McCartan, 2016:290). Semi-structured interviews are also recognised suitable in the case of few potential participants, as for the limited number of interviewees in this inquiry (Saunders *et al*, 2019). In using semi-structured interviews, the researcher develops an interview guide to ensure the coverage of the meaningful topics. The guide is designed as a checklist of topics 'to support the narrative of the interviewee' by maintaining the flexibility of moving back and forth across the sequence of questions and openness to issues and topics covered by the researcher and yet relevant to the interviewee (Myers, 2013; Flick, 2014:233; Robson and McCartan, 2016). With regard to the adoption of semi-structured interviews, the choice of the type of interviews, the preliminary interview questions and the checklist of topics and themes to be probed were informed by research questions, extant literature and the tentative conceptual propositions (Table 23).

Table 23. Interview guides, concepts, questions

	Key informants (Roles)	Value creation key dimensions	Key concepts	Authors	Interview questions
Interview guides	Chief information officers (CIOs), Chief Digital Information Officers (CDIOs), IT directors and data managers	Data/information (operand resource)	- 'Raw material' - Big data / Open data - Open innovation - Resource integration - Uncertainty / Asymmetry - Institutions	Adler, 2013; Baggio, 2016; Edvardsson *et al*, 2011, Egger *et al*, 2016, Gummesson and Mele, 2010, Hoarau, 2016, Morabito, 2015, Peters *et al*, 2014, Schaffers *et al*, 2011; Vargo and Lusch, 2004, Vargo and Lusch, 2016	Would you consider data as 'raw material'? What kind of data/information your company rely the most? (internal/external) What is your opinion about open data fostering service innovation? and big data? What actions, processes and practices you/your firm follow in case of missing data or in extreme abundance of data/information? How smart technology support/facilitate your use/integration of data/information? What rules and norms (explicit and implicit) guide you actions and practices?
		Smart ICTs (operand & operant resource)	- Instrumental (tool) - Resource integration - Service innovation - Institutions	Akaka and Vargo, 2014, Lusch and Nambisan, 2015, Neuhofer *et al*, 2013; 2015, Ordanini and Parasuraman, 2011 Orlikowski, 1992	
	Chief Marketing Officers (CMOs), Digital marketing officers and Knowledge Managers (KMs)	Collective knowledge (operant resource)	Smart business ecosystem Value network Resource integration Service innovation Adaptive/Absorptive/ Collaborative skills Uncertainty/Asymmetry Institutions	Edvardsson *et al*, 2012, Gretzel *et al*, 2015b; Lusch *et al*, 2007; 2010, Madhavaram and Hunt, 2008, McLeod and Vaughan, 2014, Orlikowski, 2002, Peñaloza and Venkatesh, 2006, Shaw, 2015, Shaw and Williams, 2009, Spender, 2007, Vargo *et al*, 2015, Yigitcanlar *et al*, 2008	How your organisation makes best use of its network relationships? How your organisation integrates external (incl. customers') data and know-how into business processes and activities? How knowledge and skills practices in your organisation influence service innovation? How does your company adjust its internal processes and decision making to external changes? Are such adjustments guided by the use of external resources, such as networks of relationships (formal and informal)? What rules and norms (explicit and implicit) influence the use of smart technology? And the integration of data and know-how? Could you describe what action are taken when significant data/information and know-how are missing?

The two interview guides were designed to collect the data related to each component of value creation, without excluding interrelated relationships between them at destination level. This distinction between the data (Appendix 9) and marketing/knowledge (Appendix 10) interview guides aimed at simplifying the complexity of gaining rich insights on smart technologies resources, as both operant and operand, by focusing on the data (operand) and knowledge (operant). Each guide, however, includes questions concerning the role of smart ICTs and the influence of institutions over the integration of data and knowledge. The combination of the insights from both data and marketing/knowledge informants' standpoints provided rich information about the role of institutions and the dual role of smart technologies in relation to the value creation process. All interviews addressed the crucial role of institutions and institutional arrangements concerning the shared rules, norms, attitudes, and beliefs guiding collective interactions and practices. The interviews were preceded by the collection of interviewees' background information and informal discussions to put both parties (i.e. researcher and informant) at ease before starting. For both interview guides, the set of questions was used as *aide-mémoire*, with the possible 'departures from the guidelines not seen as a problem' (Silverman, 2013:204).

5.3.4.2 Key informants interview process

The process of identifying and recruiting the key informants to be interviewed followed the sampling of participants (Table 21). As discussed in Section 5.3.3, the inclusion criteria were defined by the role played within respective organisations and the level of expertise in the fields of data management, advanced technologies, service marketing and strategy. Knowledgeable people in cross-functional roles (e.g. strategic marketing and operations) were also included as valid informants, while strong expertise in all other functions (e.g. human resource, finance and accounting or customer service) were excluded.

Given the significant time spent in the endeavour of collecting interviews, the process of recruiting was experienced as a critical task as for case study researchers in tourism studies (Okumus *et al*, 2007). To recruit knowledgeable key informants, the researcher adopted a flexible and diversified strategy, including formal and personal interactions (Laurila, 1997), across different steps. The methods of recruitment were formal direct and institutional contacts; snowballing, interpersonal connections, and referrals; occasional encountering. Such a diversified approach to the recruitment of informants was intended to maximise

the collection of interviews. Firstly, a formal strategy was adopted to request interviews by sending emails directly to potential informants and indirectly to the human resources, respective department offices (namely, marketing and IT) and head offices to grant access to the key knowledgeable people. At this stage, only three (3) interviews were collected and thereby *snowballing* strategy was not successful (Patton, 2002; Okumus *et al*, 2007). Interviewees provided identification and references to new potential interviewee, which were called by phone and contacted by email without success. Secondly, the interpersonal contacts and referrals method was successfully applied and three (3) more interviews were collected, with the help of the Director of Studies of the supervisory team for this research. Thirdly, the remaining five (5) interviews were collected through a mix of personal email invitations and occasional encountering with IT and marketing managers/executives at events, conferences, workshops and seminars focusing on smart city initiatives, knowledge economy and tourist destination management. The iteration of data collection did not result in additional interviews collected.

Location, dates, number, and duration of interviews

In qualitative studies, the number of interviews is not necessarily linked to the depth and breadth of a study. Several researchers (Guest *et al*, 2006; Francis *et al*, 2010; Namey *et al*, 2016) indicate that the most common themes saturation in qualitative analysis occurs approximately in the 6-20 interviews range. However, this should be merely considered as indicative, provided that saturation of themes may occur at a number of interviews fewer or larger than expected, which makes it an elastic notion to be quantified and a rather difficult point to identify or compare (Mason, 2010; Marshall *et al*, 2013).

A total of eleven (11) face-to-face interviews were carried out with individuals between February 2018 and May 2019 in the Manchester Corridor. Table 24 outlines the breakdown of interviews in terms of key informants' role, function, recruitment criteria and interview reference codes for both types of interviews. Each interview lasted between 30 and 60 minutes leaving enough time for any further discussion not limited by the topics covered. Interviews took place in different locations and venues, including rooms at the Manchester Metropolitan University, participants' offices, hotel lobbies, public restaurant, and cafes. All interviews were digitally recorded to ensure accuracy in responses transcription and improve reflexivity.

Table 24. Breakdown of interviews

Interview sources (number of interviews)	Key informants		
	Role (Function)	Recruitment criteria	Interview Code
Data (4)	Data manager (Cross functional)	Data management expertise in cultural/creative sector	D1
	Data mobility manager (Strategy)	Extensive expertise in transportation Data/IT management and analysis	D2
	Digital Data manager (Operations)	Strong expertise for IT systems and data management in cultural/creative sector	D3
	Senior consultant (Cross functional)	Marketing data analysis expertise in Arts and Event management	D4
Knowledge (7)	Strategy manager (Strategy)	Extensive and strong expertise in digital marketing and smart ICTs	K1
	Marketing manager (Marketing & Sales)	Practical experience in social/community marketing management in hospitality	K2
	Head of digital marketing (Cross functional)	Extensive expertise in destination marketing and management	K3
	Marketing manager (Strategy)	Expertise in smart technology applications and solutions for culture/events	K4
	Smart city officer (Innovation policies)	Strong knowledge of smart city initiatives and innovation programmes	K5
	Programmes manager (Digital innovation)	Strong practical knowledge of social innovation, smart ICTs applications to arts and events	K6
	Marketing director (Strategy)	Marketing expertise in arts, cultural events, and hospitality	K7

Piloting

In quantitative and qualitative research, pilot studies are carried out before entering the research field. Several authors (Van Teijlingen and Hundley, 2001; Denzin and Lincoln, 2005; Xiao and Smith, 2006) consider piloting as an essential part of the overall research process, with regard to training skills, sampling, research protocol design and analytical tools. A pilot can also be used to refine and reduce the number of preliminary concepts, in addition to the assessment of interview instruments (questionnaire or interview guide) and questions accuracy (Yin, 2011; Bryman, 2015). Undertaking a pilot study in the form of research tools pre-testing, however, can arguably be an implicit practice of qualitative research. One of the major arguments in favour of piloting concerns entering an unknown field or topic of research with valid skills and instruments. Although this can be beneficial to novice researchers who need to contain the study and concepts into specific boundaries

(Van Teijlingen and Hundley, 2001), a distinctive pilot phase in qualitative studies may present limitations and inconsistencies. Morse (1997), Holloway (1997) and Perry (2001) refer to the iterative and reflexive nature of qualitative research, with the researcher moving back and forth in the analysis and collection of data. In the sequence of interviews and analysis, new insights gained from a previous interview or theme "improve" specific questions and analytical interpretation. This does not mean that conducting a pilot is not relevant or appropriate in qualitative inquiry. But, in practice, it is hard to quantify the right number of interviews for a pilot to assess the suitability of an interview guide or a specific question thereof. Moreover, the inclusion of pilot data in the main study would not affect final findings (Holloway, 1997) considering the active and reflexive role of the researcher (Section 5.2.4) and the distinctive interpretation of quality in contrast to the validity and reliability of quantitative studies (Section 5.5).

Thus, the first three interviews collected from data and marketing informants between February and March 2018 were used to practice the researcher's one-to-one interviewing technique and test the interview guides. Since the order of questions used in interviews is not relevant to the data collection strategies, the structure of the interview guide was not changed. Considering that interview guides were used as memory aid, few questions included in the guides were simplified and reduced in length to enhance the interaction with interviewees and facilitate more clear and spontaneous responses. In addition to the inclusion of an open-ended question asking an opinion on how value can be co-created in Manchester, the questions appearing redundant or too broad in scope were removed from guide or integrated with other questions to improve the effectiveness of interviews.

5.3.4.3 Secondary data collection

The secondary data collected were of the documentary type and mainly written material, except for audio (podcast) and visual material (images, maps). In harmony with research objectives, research questions and main assumptions of this study (Sections 1.4, 1.5 and 4.4.1), the secondary data sources were purposely selected by considering three elements. First, the Oxford Road Corridor socio-economic and geographical boundaries as presented in Section 4.5. Second, the actors operating in the Smart Corridor, including some of the organisations interviewed for primary data collection (e.g. Manchester City Council). Third, the different smart city initiatives and projects that occurred in the Oxford Road Corridor.

Table 25. Secondary data collected for analysis

Secondary data			Type of data	Quantity	Data ID code
References	Description	Source			
AR/VR Creative Hub	Smart ICTs Research Centre	Twitter	Text	676 tweets	ARVR
Manchester Museum	Learning and Engagement official account	Twitter	Text	1,356 tweets	MM
Smarter City (City Council)	Smart city Policy team account	Twitter	Text	1,361 tweets	SCMcr
Bee in the City (official account)	Interactive art trail	Twitter	Text	425 tweets	B-City
Beelines	Cycling and walking network project	TfGM Report	Text	1 pdf	BL
Smart City World	MaaS road test	news article	Text	-	MaaS
Knowledgecities	Knowledgecities event	Twitter	Text	tweets	KCities
Citizens of Manchester	Marketing Manchester digital campaign	Twitter	Text	28 tweets	CMcr
CityVerve	Official account	Twitter	Text	667 tweets	CVerveTW
	End of project article	blog post	Text	-	CV-end
	Wi-Fi case	blog post	Text	-	CVWiFi
	See Sense case	blog post	Text	-	OISSense
	Future Everything case	blog post	Text	-	CV-FE
	Manchester Plinth case	blog post	Text	-	CV-MP
	PlaceCal case	Twitter	Text	80 tweets	PCal
	End of project panel discussion (audio)	Podcast	Text	2 pdfs	CV (CV1, CV2)
Oxford Road Corridor	Corridor partnership	Twitter	Text	361 tweets	ORC
Synchronicity	Official smart IoT project	Twitter	Text	328 tweets	SCity
MMU	Bee sculpture (Oxford Road station)	Webpage	Image	1	Not coded
About Manchester	Oxford Road digital cycle counters	Webpage	Image	1	Not coded
Visit Manchester	The “Hatch” setting	Webpage	image	1	Not coded
Future Everything	Street art installation	Webpage	image	1	Not coded
Mapping GM	Manchester map	Webpage	image	1	Not coded
Manchester City Council	Oxford Road Corridor map	Webpage	image	2	Not coded
IEEE Internet of Things	CityVerve trial, BT and See. Sense	Study article	image	1	Not coded

Table 25 shows the details of all data collected and used in this study. All secondary data were collected between December 2016 and September 2019, with the most of them retrieved between February 2018 and September 2019. Text-based data, like online news

articles, official reports, and podcasts transcriptions, accounted for most of the material used and accordingly coded in the complementary analysis of value creation (Chapter 7). The collected visual material (images and maps) was not included in the thematic analysis, not coded, and yet integrated as supplementary evidences to support the secondary data analysis and the definition of the smart Corridor context (Section 4.5).

To complement primary data analysis, the selection of diverse data source was purposely in line with the criteria adopted to identify primary data participants and key informants within the Corridor. Whereas webpages, online news articles and podcasts are easy to be accessed and downloaded, social media require additional processing and filtering. In this study, for example, Twitter messages (Tweets) were retrieved through the NCapture web extension enabling the download of a certain amount of data streams and import them into the NVivo CAQDAS software for analysis and filtering (Section 5.4.2). The number of tweets downloaded as datasets and their time range were in fact defined by the software, rather than the researcher.

5.4 Data analysis and interpretation

Qualitative data analysis and interpretation are not mutually exclusive or distinguished by 'lines clearly drawn […] where analysis becomes interpretation (Wolcott, 1994:11). This is a common attribute of methodologies using inductive reasoning, as previously discussed (Section 5.2.1). The concurrent practice of collecting and processing qualitative data has been recognised by several scholars (Miles and Huberman, 1984; Patton, 2002; Silverman, 2013). This involves a set of highly iterative and reflexive processes, with the research aim, objectives and the preliminary conceptual frameworks supporting the initial approach to data analysis. It also applies to the interpretation of findings, which extends the analysis by advancing questions and personal reflections of the researcher situated in the context of the research before re-turning to theory (Wolcott, 1984; Silverman, 2015). As such, the analysis holds a data-driven approach consistent with the extant knowledge about value creation in smart tourism destinations and the purpose of this study.

With regard to the primary data analysis, each collected interview was firstly transcribed from audio recording into textual documents and provisionally analysed by hand before moving to the next interview. The incremental examination and reviewing of data helped to connect them with emerging insights and prompted concepts, categories, and themes

refinement and/or expansion (Strauss and Corbin, 1990; Braun and Clarke, 2006; Saldaña, 2015). Any adjustment of the *data-related* and *knowledge-related interview guides* (see Table 23) enabled focus and understanding of resource integration, service innovation and value creation insights from the interviewee perspective. The process of moving from the initial attempt to develop categories to the 'development of these categories into more general analytic frameworks with relevance outside the settings' was applied to the data collected from data managers and marketing/knowledge informants (Glaser and Strauss, 1967; Silverman, 2013:248).

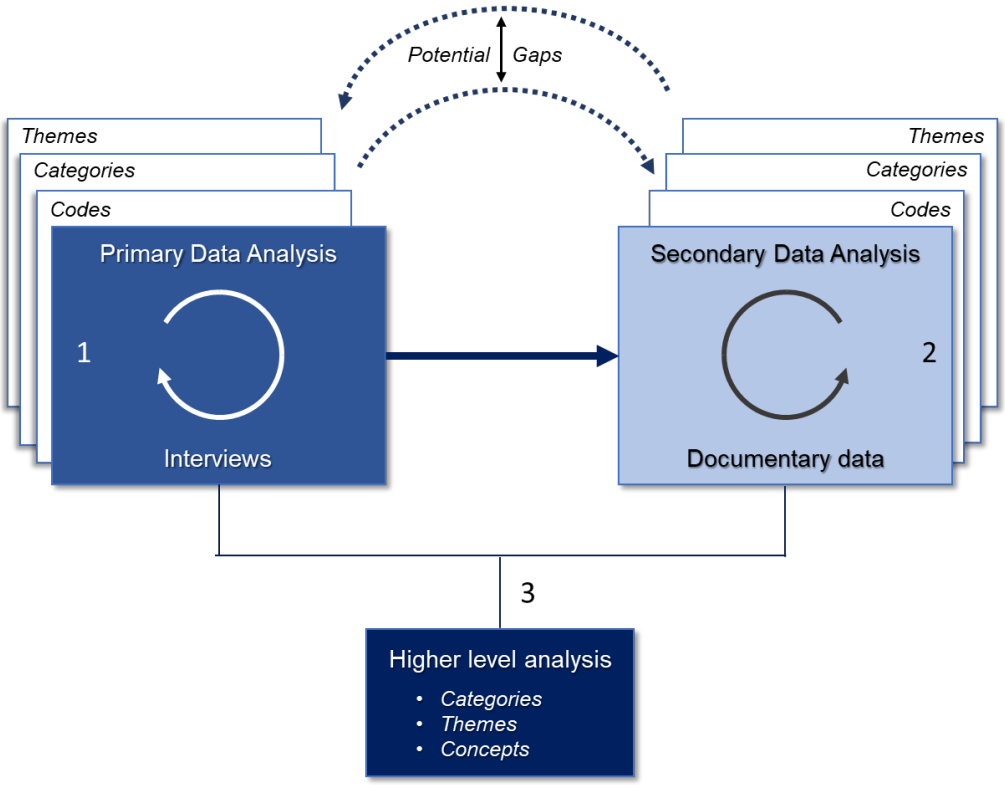
Considering the holistic approach of this study towards value co-creation in Manchester, data collected from different key informants were analysed without implying a direct link or relationship between them. Nevertheless, primary data (knowledge and data interview findings) were distinctively collected and collectively analysed to obtain rich information about the relevant components of the value creation process, while maintaining a holistic approach towards the phenomenon. The thematic analysis of qualitative secondary data enriched primary data, while providing additional knowledge of the phenomenon. Being typical of qualitative studies, the large amount of textual data generated by this process required a large amount of time in transcribing, analysing, and interpreting the findings. Such a prolonged immersion in the data entails the benefit of gaining in-depth knowledge as well as the challenge of providing a "good" interpretation in terms of its usefulness and quality (Section 5.5). To facilitate the analytical approach to data, the analysis of primary and secondary data was carried out using the NVivo CAQDAS.

5.4.1 Secondary data analysis

The choice of conducting a secondary data analysis concerned several interrelated aspects of this study. As suggested by literature and qualitative research practice, the analysis of pre-existing data collected mainly pertained the enhancement of overall trustworthiness (Silverman, 2013; Sherif, 2018), 'support to primary data collection and analysis' (Irwin and Winterton, 2011; Dufour *et al*, 2019:2) and attain more in-depth knowledge in relation to primary data analysis, including the discovery of potential gaps in the conceptualisation of the theoretical frameworks (Heaton, 2004; Gläser and Laudel, 2008). With respect to this very last aim, in addition to all above benefits, the thematic analysis of secondary data was carried out to respond better to the research questions without distinction among them.

As shown by Figure 26 the secondary data analysis was carried out through an iterative process informed by the primary data, but not limited by them and open to the generation of new themes and concepts or suggesting potential gaps in the conceptualisation of the relevant themes. In essence, the secondary data analysis followed the same steps of the Thematic Analysis strategy adopted for primary data (Table 26). The generation of initial codes from secondary data (Phase 3) and the search for themes (Phase 4) was facilitated by the primary data themes guiding this complementary procedure within the objectives and overall aim of the study. This approach and the use of an additional, subsequent and complementary analysis is congruent with the contextual nature of this study embedded in the primary data (Irwin, 2013), and situated in the phenomenon being investigated, the methodological assumptions as well as the research design. Although the 'supplementary analysis was found to be the most common form of qualitative secondary data analysis (Heaton, 2004:42), it presents limitations and methodological issues related mainly to the use of secondary data affecting the quality of a study, particularly in terms of their interpretation, and the 'distance' between the researcher and the data (Johnston, 2017). Such limitations and issues are common to any type and source of secondary data analysis (Ruggiano and Perry, 2019).

Figure 26. Secondary data analysis



While the problem of the active role of researchers in the collection and analysis of data has been found hard to be solved or mitigate, since it also concerns researchers re-using their own data sets (Heaton, 2004), the selection of data from various sources and strongly related to the smart context of value creation as well as the analytical approach adopted aimed at mitigating the impact of data collected and used for a different scope on the overall analysis and quality of this study (Bishop, 2007; Dufour *et al*, 2019). Considering the benefits, limitations, and the contribution of a secondary data to the inquiry, their analysis was conducted with the help of a CAQDAS software (NVivo), as for primary data.

5.4.2 CAQDAS (NVivo) and data analysis

The CAQDAS is a software relying on a proprietary database that enables a broad range of data in a digital form (e.g. textual, images, audio, and video) to be stored and manipulated through coding, notes and labels. This software has clearly become 'an essential tool for many [qualitative] researchers in the last 20 years' (Gibbs, 2013:277). Nevertheless, such widespread use of CAQDAS presents advantages and some major caveats. A crucial benefit of using these tools lies in the efficient management of a large set of data, which can be quickly retrieved, labelled, classified, and linked one another for analysis at any time. In comparison to a manual approach to data analysis, this is clearly a great advantage in terms of time and researcher's focus on data without being overwhelmed by them. In fact, the researcher can count words or phrases in the source data, code them and attach analytic memos to them for easier searching and querying (Saldaña, 2015), with a high degree of flexibility in the approach to analysis. Whereas some authors (Lewins and Silver, 2007; Woods *et al*, 2016) acknowledge that the use of CADQAS improves analytical reflexivity by reducing the distance between data and the researcher, others (Hinchliffe *et al*, 1997; Barry, 1998, Welsh, 2002) contend that this kind of software allow researchers to distance from data and thus apply quantitative approaches to qualitative data. The transparent and systematic approach to data ensured by CADQAS, in either way, improves analytical rigour and trustworthiness of the study (Welsh, 2002; Gibbs, 2013).

Some significant limitations, however, should be considered. Emergent themes and codes as well as their connection to elicit meaningful conclusions from data cannot be identified by the software (Saldaña, 2015). There is also the risk of falling into 'a coding trap' created by excessive or redundant code categories leading to fragmented and decontextualised

conclusion (Gilbert, 2002:220; Bazeley and Jackson, 2013). Even if this could denote 'heterogeneity of data and the complexity of the analysis', it could also prevent the researcher from developing 'further analytic work' and 'a clear understanding and explanation of the data' (Gibbs, 2013:286). Hence, a CAQDAS cannot replace the key role of the researcher, despite some concerns about the influence of the software in "guiding" the analysis towards a specific direction (Welsh, 2002). Thus, the QSR International NVivo 11 software was used to carry out the analysis of this study because of its ability to assist the management of collected data, run queries, visualise, and report from data (Bazeley and Jackson, 2013). The researcher familiarised with the software and undertook training in several specific workshops to gain the capability of coding, categorising, retrieving data, analysing, and reporting with NVivo.

5.4.3 Thematic analysis and coding

The qualitative primary and secondary data of this study were analysed using the Thematic Analysis (TA) method. TA involves the identification of patterns of meaning emerging from data (themes) and their interpretation to generate insights about a specific phenomenon (Guest *et al*, 2011), with focus on meaning within a dataset (Braun and Clarke, 2006). The choice of TA as an appropriate method for this study was essentially driven by its flexibility towards theoretical or epistemological positions, data analysis and interpretation. Braun and Clarke (2006) place TA in the continuum between inductive and deductive approaches to data and analysis as well as between realist and constructivist perspective. In the light of such flexibility, the researcher needs to make analytical choices based upon clear and rigorous process to elicit meaningful answers to the research questions and ensure the credibility of the study (Fereday and Muir-Cochrane, 2006). The systematic development of codes and the identification of themes was, therefore, conducted according to strict guidelines applied to both primary and secondary data. With the NVivo software assisting the entire process, the analytical strategy (Table 26) was developed by adopting, adapting and integrating the strategies suggested by scholars advocating TA (Boyatzis, 1998; Braun and Clarke, 2006; Fereday and Muir-Cochrane, 2006).

Thematic analysis and the interpretation of findings included the following phases (Braun and Clarke, 2006): familiarisation with data (transcription of initial ideas); data coding and searching for themes; reviewing themes (checking themes-codes relationship at different

levels); defining and naming themes (ongoing analysis); producing the report (writing up). The aforementioned flexibility of TA allowed the adoption of strategies that are consistent with the generation of codes and themes. In line with the fairly inductive approach of this study (Section 5.2.1), the main theory-driven categories (Appendix 11) will only be used to guide the initial generation of codes, without including them in the primary and secondary data analysis. This avoided any potential analytical misunderstanding in terms of inductive reasoning, which is initiated by *a priori* categories and not tied to them as in deductive studies. Organising manual codes around concepts that are connected to the research questions, preliminary conceptual frameworks, and propositions (Sections 1.5 and 4.4), in practice, provided a starting point to the initial coding of primary data from interviews. The theory-driven categories also helped avoiding conceptual drifts during the primary and secondary coding processes. The broad tentative categories, recognised as relevant from the literature review, were reconceptualised and/or refined through additional levels of meaning (sub-themes) or abandoned if they are too broad or irrelevant. As new concepts were generated from empirical data, the patterns of themes (categories of meaning that became rather large) were analysed through an immersion into the primary data showing a link to the literature and theory-driven themes as guidance. The same approach was then adopted in the secondary data analysis by paying attention to the connection of generated codes and themes with the research questions, research objectives, context of the study, theory-driven categories and particularly the actual themes and concepts resulting from primary data analysis, which guided the initial coding. This iterative process of reference, however, did not entail any commitment to each and all a priori coding categories, despite the use of the preliminary conceptual frameworks and proposition.

The initial manual coding phase was guided and not bounded by the preliminary theory-driven categories. As such, the first step of the TA process (Phase 1) illustrates the flexible approach adopted towards the mere use of *a priori* categories to help the researcher in setting out the basis for a systematic exploration of codes without using a hybrid approach (Fereday and Muir-Cochrane, 2006; Nunes and Al-Mamari, 2008), while familiarising with the data (Phase 2). The generation of initial codes (Phase 3) through tentative labelling and re-labelling of portions of text resulted in a basic structure of codes and categories (open coding) that were re-defined and re-structured on the ground of identified patterns in the data (Phase 4). In doing so, sub-themes were also identified to provide in-depth meaning

to the coded data and categories in relation to the research questions and propositions in an iterative process applied to the following phases.

Table 26. Thematic analysis strategy

Phases	Steps	Processes and procedures
Phase 1	Initial manual coding	Development of tentative codes and/or categories linked to the conceptual framework and propositions underpinning the thematic map illustrating the relationship between key concepts (). The '*a priori* categories guiding the initial manual coding are not to be seen as "themes"' (Boyatzis, 1998; Nunes and Al-Mamari, 2008:67).
Phase 2	Familiarisation with primary data	The process started during data collection and ended with the transcription of audio recorded interviews into text, reading and re-reading, noting down comments to highlight ideas, codes and categories of potential interest for themes development (Braun and Clarke, 2006; Clarke *et al*, 2015)
Phase 3	Generating initial codes (open coding)	Identification and labelling segments of text with short phrases, with attention to the literature-based coding categories (theory-driven categories) and research questions. This immersive organisation of data into meaningful groups was the first step in the process of identifying patterns in data (Clarke *et al*, 2015; Vaismoradi *et al*, 2016) (Appendices 13, 14 and 18)
Phase 4	Searching for themes (pattern coding)	Identification of the strong analytical direction. Critical comparison of codes and categories across data set in relation to research questions and initial coding (Phase 3). At the end of this phase, codes are included in broader themes. Iterative review of coded data to identify areas of similarities and overlap between codes to create "strong" categories or cluster of themes. Generation of sub-themes.
Phase 5	Review of themes	Further development of themes and sub-themes identified in Phase 4, which were reviewed and restructured in relation to collated extracts of data and entire data set. Themes and sub-themes boundaries were drawn and re-drawn, with codes included/discarded at different levels depending on their relevance against data. This step provided in-depth understanding of the meaning attached to data and the credibility of the themes/categories with a higher level of abstractions. (Braun and Clarke, 2006; Vaismoradi *et al*, 2016). (Appendices 17 and 20; Figure 30)
Phase 6	Defining and naming themes (Interpretation)	Fine-tuning of the analysis. Analytic narrative was set up around the meaning attached to themes across the entire data set. This provided the reader with information concerning researcher's interpretation of data and their meaning in the context of the study. In this phase, the analysis moved beyond descriptive data towards the interpretation of their meaning (Vaismoradi *et al*, 2016; Walters, 2016)
Phase 7	Producing the report	Final review of extract of data meaning, with selection of memos and notes to be include in a structured document. This final step correlates with literature codes and categories that survived across the analysis. Reporting of consistent and logical connections between themes produced in an argumentative way. The report provided the basis for the discussion of findings**.**

(Adapted from Boyatzis, 1998; Braun and Clarke, 2006)

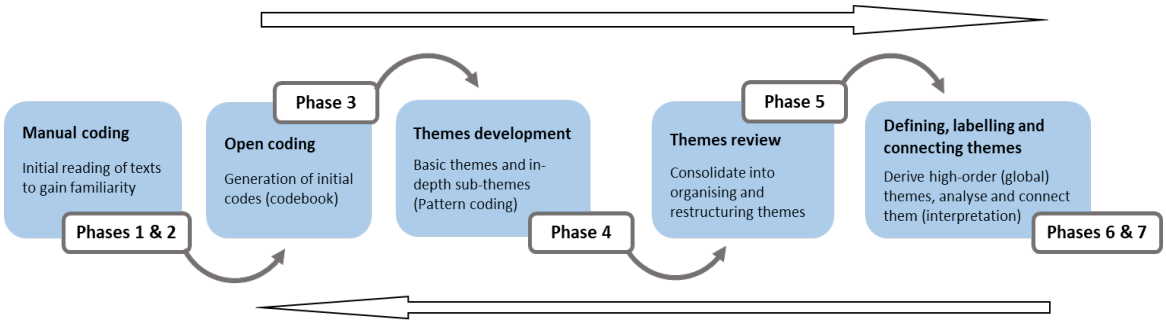
The review of themes, sub-themes and categories (Phase 5) allowed a deeper level of understanding attached to the data by increasing the level of abstraction, which helped

the researcher in providing analytical interpretation of the findings after a final definition of the broader themes and categories (Phase 6). The iterative analytical process denoting the entire TA strategy culminated in the argumentative final review of the analysed data (Phase 7) and their connection with the theme generated and the *a priori* theory-driven categories. Accordingly, data were analysed and discussed (Chapters 8, 9 and 10) at both node (analytical units of text) and network level (themes and sub-themes/categories).

5.4.3.1 Coding process and themes development

The thematic analysis was carried out through a systematic coding process entailing the generation of codes and themes. According to Miles and Huberman (1994:56), codes are 'tags or labels for assigning units of meaning to the descriptive or inferential information compiled during a study'. A theme, instead, 'captures something important about the data in relation to the research question and represents some level of patterned response or meaning within the data' (Braun and Clarke, 2006:82). Thus, coding occurs at the individual interview level (unit of coding), while themes are generated throughout the whole dataset (Boyatzis, 1998). Figure 27 illustrates each and all analytical steps concerning the iterative coding process of this study, in line with the thematic analysis phases (Table 26). The same process was followed in the coding of secondary data starting from the high-order themes generated from primary data coding (Phases 6 and 7).

Figure 27. Iterative coding process



(Adapted from Walters, 2016:110)

Through repeated readings of the transcribed interviews, the data were manually coded (Appendix 13) by using *descriptive, exploratory* and *initial* coding approaches to reduce, simplify and summarise the basic topics within the text for the production of tentative and provisional codes (Miles and Huberman, 1994; Saldaña, 2015). A more holistic and detailed

approach was adopted for the analysis of each and all transcripts that were progressively uploaded into NVivo. The transcripts from data and marketing informants' interviews were all processed and coded together.

Table 27. Initial coded categories (excerpt from the codebook)

Code name	Code description	Example
Addressing barriers and limitations	Referring to the different ways of facing and dealing with the barriers and limitations affecting the value creation process and its components (for example, the use of knowledge and skills or collaboration to face the lack of data)	[…] *rely on existing relationships or existing knowledge and data to do that. Yeah, I don't think we're the place where we can be entrepreneurial. I don't think we…well we do it historically* (K3)
Barriers and limiting factors	Referring to all challenges and issues (practices, activities, and resources) preventing the creation of value, its components, and the application of related resources (for example, the lack of data, information, and skills)	*In Manchester, for instance, there's a massive gap in terms of analytics skills. There's a massive gap in terms of understanding.* (D3)
Contextual factors	Referring to all tangible and intangible factors positively or negatively affecting the value creation process as well as the access and use of its key resources. Such factors are situational and solely referred to the Oxford Road Corridor context.	*I don't know if that's a Mancunian thing or it's just a general thing. But I think any of those conversations will have that same sort of vibe. I think that's where the seeds get planted to try stuff and work together and you get used to work together, so you trust each other.* (D4)
Service orientation	Referring to the use, integration, provisioning and enhancement of services and any related strategic view (for example, city marketing and promotion at destination level).	*Whether or not the app is the interface but at least to have some sort of integration and coordination system that both provides rich data for planning and provides useful information to citizens and tourists*. (K4)
Value creation enablers	Referring to all factors (activities, practices, and attitudes) enabling and sustaining value creation and its components.	*It's our job to provide data, provide reporting that helps other organizations to do their job essentially and to make decisions* (D4)
Value creation practices	Referring to all value creation practices associated with the data, information knowledge and ICTs resources, including the engagement and involvement of users.	*APIs are just a mechanism for low friction sharing of capabilities and then the other worlds build on… that's only because the API have cut the friction out of the rest of it.* (K1)

Initial codes were generated, at this stage, by using an open coding strategy based on a line-by-line process to explore consistent meanings in the coded data and set the basis for categories and concept building. As stressed by Strauss (1987:28), open coding starts by 'scrutinizing the fieldnote, interview, or other document very closely; line by line, or even word by word. The aim is to produce concepts that seem to fit the data'. In doing so, the

data were analysed in detail by *splitting* the text at sentence and paragraph level, alongside the application of the *In Vivo coding* to highlight informants' voice and the *Process coding* to underline actions/interactions in the data in relation to any of the relevant set of meanings underpinning initial categories (DeCuir-Gunby *et al*, 2011; Saldaña, 2015). In the final step of this initial coding phase, coded and codable textual data followed a *lumping* classification to support a holistic approach, with more attention to an early generation of the categories significant to the research questions. Open coding has been deemed as a long and laborious process requiring 'an enormous amount of coding, much of which you will never use' (Rubin and Rubin, 2005:222), despite the benefit of the in-depth extraction of meaning from the text (Strauss, 1987; Flick, 2014). The use of theory-driven categories (Appendix 11) helped to mitigate the disadvantage of elaborating several recoding stages by guiding the identification of the relevant meaning expressed by interviewees across the list of codes. So, the open coding process ensured a data-driven approach for the creation of codes and a codebook, or initial coding manual, including code descriptions, exclusion, and inclusion criteria (Appendix 14).

With the help of the NVivo software (Appendix 15), the codes and themes were inductively reduced, grouped, and compared within the six, slightly, different coded categories (Table 27) from the theory-driven ones. This categorisation of codes entailed a constant review and comparison of the generated themes with iterative movements across the increasingly reduced analytical units. The coding phases of the thematic analysis were guided by the identification of several types of pattern (similarities, correspondences and differences), action/interactions (process coding) and the relevant voices of informants (*In Vivo coding*) across the data (Saldaña, 2015; Vaismoradi *et al*, 2016). Table 28 shows the process of *pattern coding* for the *collaboration* code later associated with the *value enablers* theme. The six very broad categories (themes), organised across the first four phases (Figure 27), were refined and reduced to five super-ordinate themes generated throughout the several coding cycles. Such primary themes (*value creation enablers*; *value creation components*; *barriers and limiting factors*; *addressing barriers and limitations*; *contextual factors*) were developed as the result of a coding abstraction structured in sub-theme, category and up to three sub-codes for each theme (Figure 28). With the help of pen-and-paper memos and NVivo coding queries, the organisation and restructuring of themes was carried out by constantly interrogating the whole dataset, at both node ('code labels attached to the

text') and network level, as directional *edges* or 'the relationship(s) or interaction(s) between the nodes' (Pokorny *et al*, 2018:171-173).

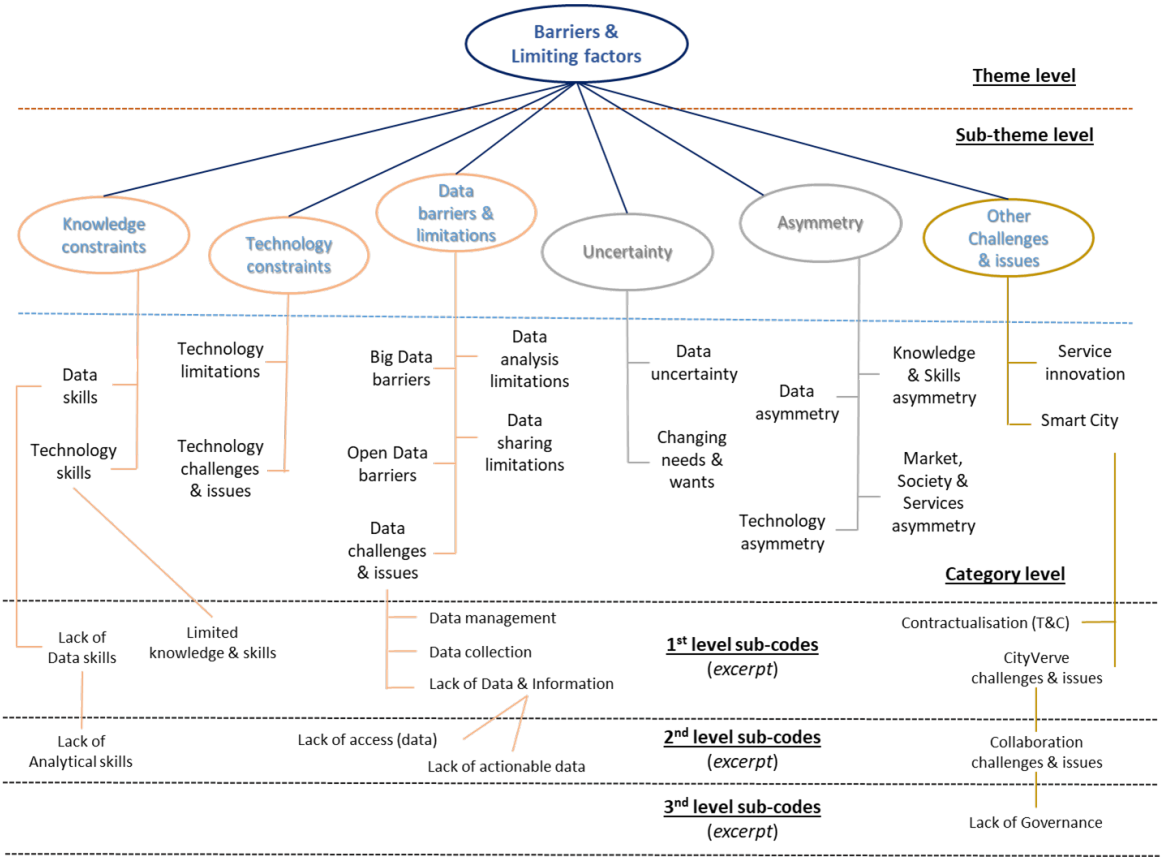
Table 28. Pattern coding example (collaboration)

Similarity/Correspondence coding		Pattern code
I think there's a, I think, good potential…I'm thinking about how organisations within a particular area or within the city work effectively together (D1)	Work together	Collaboration
Yeah. I mean, again, it depends on who it is, like, you know…quite often sensible riders or data analysts or sort of firms with ideas. I'd really like to collaborate and do stuff and try things out […] Certainly, in my experience everyone has been very open to sharing and just exploring stuff together. (D2)	Collaborate - Exploring together	
So, there's that real spirit of collaboration here that we support through the work that we do and through data and essentially more insight into the visitors. (D4)	Collaboration spirit	
[…] that's a collection of sorts of all the hotels in Manchester, they come together, they have three different sort of divisions (K2)	Coming together	
Yes, we collaborate with Visit Britain a lot on new types of activity or new initiatives, we collaborate with businesses, we collaborate with our stakeholders. So, people who are interested in the tourism economy in Manchester (K3)	Stakeholders collaboration	
Well, we can bring you together with partners and that's what we do obviously with CityVerve […] we're trying to do things, to join things up and work with both private sectors partners and public sector partners in a smart way (K5)	Public & private partnership	

Beyond the single node, category, sub-theme and theme levels, this process allowed the searching for evidences of connections between nodes and *edges* to increase the level of abstraction within the thematic network of primary data resulting from the development of coding/themes structure. As clarified by Attride-Stirling (2001:389), thematic 'networks are only a tool in analysis, not the analysis itself' since they help in the interpretation of data. The thematic network resulting from primary data analysis (Appendix 17) guided the analysis of secondary data, which followed the same approach and the steps of the primary

data analysis with the exception of the first two phases (i.e. Phase 1 and 2 in Figure 24). Following the complementary analysis of secondary data (Chapter 7), themes, sub-themes and categories were generated and refined through the combined analysis of primary and secondary data (Appendices 20- 28).

Figure 28. Theme structure: barriers and limiting factors example



The organisation of themes and their structure reflected the analysis of findings in relation to the research questions and objectives of this study. Data and information as well as the inter-organisational knowledge-based practices and activities were into the *value creation components* theme (research objective 3), along with the smart technology component. The institutions (i.e. rules, norms, beliefs, and laws) and institutional arrangements were categorised within the *contextual factors* theme (research objective 4). The identification of data and knowledge sharing as part of the *value creation enablers* theme helped to understand the specific influence of these key components of the value creation process in terms of facilitators (research objective 2). Such an overarching classification of themes, sub-themes and categories supported a holistic approach to the conceptualisation of the

value creation process linked to the tentative propositions suggested in connection with the preliminary conceptual frameworks (Section 4.4). The conceptualisation of final major themes was carried out after the analytical development of the secondary findings codes, categories and themes, in a move back and forth between the thematic network, research questions, objectives and propositions to review the tentative conceptual frameworks and identify the relationships of its elements (research objective 5).

5.4.3.2 Secondary data coding process and themes

The secondary data analytical process was entirely conducted using NVivo (Appendix 16). The thematic network resulting from primary data guided the entire process and reduced the time required to complete the documentary data coding. Still, the interrogation of data let additional and different codes and themes to be generated outside the "boundaries" of primary data coding. Alongside several ungrouped codes, the initial coding generated the following categories, or *buckets*: addressing barriers and limitations; Bee in the City; CityVerve; collaboration and partnership; collaborative interactions; contextual factors; engaging; interactions; knowledge and skills; knowledge sharing; Oxford Road Corridor; smart city projects; smart city; sharing; technology; users engagement/involvement; service/social innovation (Appendix 17). The NVivo software helped to carry out the search for codes and categories through a several number and type of queries (Appendix 19), with the identification of patterns in textual data that was based on the same coding strategies (pattern, process and *In Vivo*) adopted for primary data. While *In Vivo coding* concerned the actual spoken words from the transcribed podcasts, the pattern and process coding referred to all textual data collected. Table 29 shows the pattern coding example for the *sharing* sub-theme. With reference to the primary data analytical development, the value orientation category did not evolve into a sub-theme or theme. However, the secondary data analysis generated a new theme (Innovation) as well as several diverse sub-themes and categories within the same major theme identified in the analysis of interviews. Figure 29 illustrates the coding process and the abstraction of the *innovation* theme throughout its development. Alongside the new higher-level theme of *Innovation*, the secondary data coding process generated five major themes (*value creation enablers*; v*alue creation components*; v*alue creation constraints, addressing constraints, contextual factors*) that are consistent with the ones resulting from primary data analysis. Despite such a similarity, the analytical development of each documentary data theme produced a slightly different

final coding structure on account of coding levels, categories, and sub-themes (Appendices 22-28).

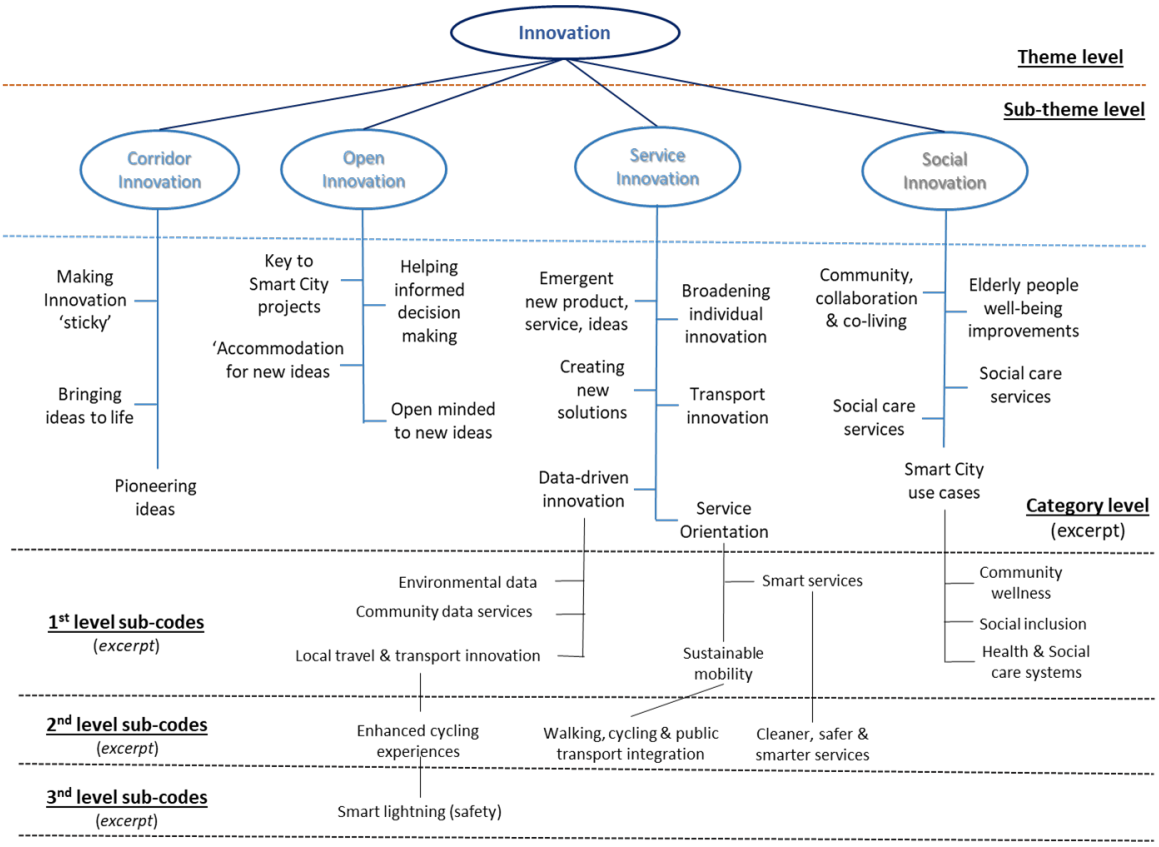
Table 29. Pattern coding example (sharing sub-theme)

Similarity/Correspondence coding		Pattern code
When connecting to CityVerve Wi-Fi, visitors are greeted with engaging, swipeable cards that share relevant content and information from the venue and the surrounding community (CVWiFi)	Data & Information Sharing	Sharing
The open source PlaceCal platform coordinates and publishes high quality event and organisation information in a variety of formats, creating a really easy to use central source of community data that's updated directly by residents. (PCal)		
[…] for city data sharing toolkit workshop with good mix of cities agencies and SME (SCMcr)		
[…] sharing collections knowledge and supporting evaluation of […] - museum educators, curators and teachers working together (MM)	Knowledge Sharing	
it's time to share what we've learned (CVerveTW)		
[Knowledge sharing through training/workshops] Training will be held for all delivery partners as well as specific technical workshops covering innovative approaches including data analysis (BL)		
It was great to be able to share our experiences. Looking forward to talking more (MM)	Sharing Stories & experiences	
We're so excited about this campaign because of its authenticity and the platform it provides for real people with genuine passion for the city to share their stories with the world (CMcr)		
I feel that it's important to share the lessons that came out of the project – for Manchester City Council, and myself personally (CV-end)		

Rather than affecting or changing the overall categorisation and definition of themes, the differences emerging from reduction and abstraction of secondary codes complemented the conceptualisation of the thematic network defining the value creation process. As the analytical process progressed from primary data to secondary data and the definition of final higher-level themes, all the elements informing the categorisation of codes (such as ideas, sketches, feelings about coding, personal information, analytical choices based on

literature) were kept in physical and digital folders to ensure the systematic approach across all analytical stages.

Figure 29. Theme structure: innovation example



5.5 Limitations and trustworthiness

This study holds the same limitations of any single-case study using thematic analysis to address the research problem. Along with the risk of abstractness and the lack of clear and systematic approach to data (Yin, 2014), the use of language could arguably be recognised as a limited means to analyse and interpret social reality (Alvesson and Sköldberg, 2009). Hence, single-case study criticism mainly concerns the methodological rigour, researcher subjectivity and validity or generalisability (Flyvbjerg, 2006). These limitations, however, are not grounded in trivial misunderstandings about generalisation or external validity (Walsham, 1995), but in-between design and the research problem inconsistency as well as reflexive reasoning inabilities (Yin, 2014). The overall aim of this research is to expand knowledge of value creation within the context of smart tourism destinations. Choosing the ontologically "neutral" social constructivist position is clearly a subjective claim that allows a certain degree of flexibility in choosing the appropriate methodology to develop

knowledge. In turn, the single-case design and TA hold the same agnostic stance regarding interpretation and analysis of data (Braun and Clarke, 2006; Yin, 2014). Such a subjective standpoint towards the research problem is not necessarily a "negative" thing to deal with, because it gives a perspective to other broader context of the research. Being reflective upon the entire research process is consistent with the researcher-as-instrument idea and helps to mitigate the intrinsic biases of methodological claims (Guba and Lincoln, 1994; Alvesson and Sköldberg, 2009). The iterative inductive reasoning process adopted by this study allows deep thinking while 'expanding understanding through relational reflexivity' (Gergen and Gergen, 1991). With regard to the overall quality of this study, a critical and reflexive approach to the systematic and iterative analysis of data, the research design and tools was adopted to ensure transferability, dependability, credibility and confirmability as crucial elements of trustworthiness (Table 30). To mark the analogies and distinctions from the positivist perspective, in fact, such criteria have been associated with trustworthiness of qualitative studies for methodological adequacy (Guba and Lincoln, 1994; Decrop, 2004)

Table 30. Quality criteria in quantitative and qualitative research

Quantitative research	Qualitative research
external validity	transferability
reliability	dependability
internal validity	credibility
objectivity	confirmability

(Adapted from Guba and Lincoln, 1994; Lincoln *et al*, 2011)

5.5.1 Transferability

Transferability has been referred to the application of the findings to different settings or contexts, with comparison to external validity and generalisation of quantitative research (Guba, 1981; Veal, 2017). As noted by Shenton (2004:70-71), 'the accumulation of findings from studies staged in different settings might enable a more inclusive, overall picture to be gained. Nevertheless, the qualitative research purposeful nature cannot be associated to the sampling logic of quantitative research and statistical generalisation to assess the transferability of the findings (Myers, 2013). Randomisation is not appropriate 'because knowledge of a topic is not randomly distributed in the population' (Morse, 2003:995).

Moreover, sampling may progress throughout the entire study until any additional data cannot provide new insights for categories/themes and theoretical saturation is reached (Charmaz, 2006). This process typically refers to the grounded theory, which progressively identifies the sample size (e.g. snowball sampling), but in qualitative strategies the amount of rich data obtained from each participant are inversely related to the actual number of participants (Morse, 2003). Thus, qualitative research can 'generalise to a theory from one case study or one ethnography' (Myers, 2013:9), or better, transferability can also apply to single case study (Kennedy, 1979). As Flyvbjerg (2006:228) notes,

> *One can often generalize on the basis of a single case, and the case study may be central to scientific development via generalization as supplement or alternative to other methods. But formal generalization is overvalued as a source of scientific development, whereas "the force of example" and transferability are underestimated.*

The structured approach adopted by this study in defining the emerging context in which to analyse value creation, the conceptual boundaries and the research methods fits with the suggested strategies to establish transferability (Miles and Huberman, 1994; Lincoln and Guba, 1985). Although the selection of participants and key informants is thoroughly designed to embody the complexity of the smart destination ecosystem, the findings might not be readily applied to similar context for several reasons. First, there is still no agreed definition of smart tourism destinations as concept and context. Second, findings cannot be applied *caeteris paribus* due to the complex and dynamic nature of tourist destinations and the uniqueness of the networked socio-economic structure. Third, the application of findings of a single-case study to another setting or context (transferability) depends on the knowledge, experience, and personal judgements of the reader, rather than rational criteria (Kennedy, 1979; Lincoln and Guba, 1985). Considering the use of this single-case study by other researchers, the findings provide the basis for future studies in similar or different context to further theoretical and practical definition of value creation in smart tourism destinations.

5.5.2 Dependability

The dynamic nature of value creation and the complexity of smart tourism destinations environment raise issues in terms of dependability, which refers to the replication of the study at different time and with a different "sample" to obtain the same results (Lincoln and Guba, 1985). The value creation concept proposed by S-D logic has evolved from the definition of value in use to the recent value-in-social-context, with particular attention to the dynamic role of institutions and institutional arrangements. The definition of S-D logic as a metatheory or mid-range theory developing over time allows different interpretations of value creation across diverse settings and other disciplines than marketing (Vargo and Lusch, 2017). This is clearly evident, for instance, in the critical view of value co-creation by Service Logic (Grönroos and Voima, 2013) and the application of Service Science to the smart service systems (Barile and Polese, 2010; Barile *et al*, 2017). Similarly, the early smart tourism destination conceptualisation mainly based on the key role of big data and smart technologies has developed by focusing on its social components, innovation, and value co-creation (Boes *et al*, 2016; Polese *et al*, 2018).

Thus, the fact that findings from this study can only be related to the subject involved, the range of time covered by the investigation and the specific context could raise issues if it is associated with the notion of reliability typical of quantitative research. Along with the aforementioned changes in theoretical underpinnings, the repetition of the same research using the same instruments at a later date and in a different context would not result in the same findings as expected in quantitative inquiries. This has been stressed by several authors (Lincoln and Guba, 1985; Guest *et al*, 2011; Veal, 2017) contending that the same questions cannot present the same results because of the changing socio-technological, physical and economic environment in which people experiences occur. Nevertheless, the consistency of the findings can be enhanced by reporting the sampling strategy and the analytical process in details to allow possible repetitions of the study by other researchers and expand on the findings for future lines of research.

In this study, the research design and its application in line with the aim and objectives has been clearly detailed to present and trace the logical process and address dependability issues, including the details of choices and decisions. Common to qualitative methodology approaches, the main challenges of this study concerned the choice of a sampling strategy

and the access to key participants and informants (Guest *et al*, 2006; Mason, 2010). Whilst the sampling strategy was defined by a systematic identification and selection of the smart ecosystem context, organisations and knowledgeable people thereof (Section 5.3.3), the issue of accessing key informants was addressed through a strategy based on direct emails contacts, tentative snowballing, conferences encountering and help from the supervisory team (Section 5.3.4.2).

Both reflexivity and audit trail have also been recognised as interrelated factors ensuring dependability and mitigating its limitations (Shenton, 2004; Nowell *et al*, 2017). This is, in fact, important to other researchers being able to track and trace the decision trail and the conclusions about the findings (Lincoln and Guba, 1985). The theoretical, methodological and analytical trail of this study can be clearly followed in terms of the aim and theoretical underpinnings (Sections 1.2 and 1.4), the research strategy guiding the collection of data (Sections 7.3 and 7.3.4), the analytical process as well as interpretation and discussion of findings (Section 5.4 and Chapter 6-10). The creation of a clear audit trail was crucial to the reflexive iteration process that the researcher went through the entire inquiry. Even if the absence of control over the phenomenon of interest (value creation in smart destinations) does not allow to obtain the same results, the accurate and detailed approach to data collection and analysis can also ensure the credibility of the entire study (internal validity in quantitative research). The strong relationship between dependability and credibility, as argued by Lincoln and Guba (1985), should therefore be understood in consideration of the single-case study peculiarity and the phenomenon being studied.

5.5.3 Credibility

Similar to internal validity in quantitative research, credibility accounts for the consistency of findings with the reality investigated (Shenton, 2004) ensured by the '"fit" between respondents' views and the researcher's representation of them' (Nowell *et al*, 2017:3). In other words, a consistent relationship between findings and their representation by the researcher defines credible qualitative inquiries (Schwandt, 2001). Thus, the design of the processes of collecting and translating information from key participants and informants into a credible explanation of the phenomenon played a crucial role.

To ensure credibility, this study adopted semi-structured interviews to collect the "right" information about how value can be co-created in smart destinations from key informants.

Rich information and in-depth understanding was obtained by designing two different and interrelated interview guides for the identified data and marketing/strategy interviewees (Section 5.3.4.1), with implications for high credibility in terms of presenting the fine grain information that reflect the value creation process phenomenon through its components. This was supported by the definition and implementation of a systematic approach to the analytical development of themes and concepts (Section 5.4.3). Additional techniques to address credibility included member validation, prolonged engagement, peer debriefing and examination (Guba and Lincoln, 1994; Nowell et al, 2017). The difficulty in recruiting and accessing key informants affected the prolonged engagement and member validation strategies. Despite the different strategies adopted, the researcher experienced difficulties with access to a large number of knowledgeable informants and thereby limited responses to further engagement (Section 5.3.4.2). Therefore, it was not actually possible to confirm the research findings with interviewees (member validation) and spend suitable time to establish a relationship of trust with them or other members of the selected organisations (prolonged engagement), as suggested by Bryman (2015) and Merriam (1998) to enhance credibility.

To compensate and mitigate such a limitation, the interrogation of data and the analysis of findings was carried out through a systematic and iterative process constantly exploring new ideas and meaning in the words of each and all interviewees. This process entailed a step by step approach to an interpretation of findings as close as possible to the words and the underlying meaning ascribed by participants. Furthermore, the analysis of secondary data through the same systematic approach adopted interviews contributed to reduce the respondent validation limitation by providing additional information and corroborate the words of interviewees (Section 5.4.1). In addition to the presentation of early findings and the sharing of conceptual developments to experienced peers in the network of tourism research, several debriefing sessions and frequent peer examination were also carried out between the researcher and the supervisory team that helped in drawing attention to new ideas, interpretations and flaws. While the internal validity of quantitative studies depends on the suitability and consistency of adopted tools, the credibility of qualitative studies reflects the efforts and capability of the researcher as instrument when dealing with the interpretation and representation of findings (Janesick, 2001; Golafshani, 2003). Through the iterative and flexible approach to the research process, the researcher adopted a

reflexive stance including the mitigation of his potential influence on responses through the assurance of anonymity and confidentiality during face-to-face interviews as well as clear information about the nature of the study.

5.5.4 Confirmability

Confirmability is comparable to objectivity criteria in quantitative research. The traditional notion of objectivity, as neutral stance of the researcher towards the phenomenon being studied, does not apply to qualitative inquiries because of the role played by researchers playing an active role and placing themselves in the context being studies to understand and interpret the perspective of participants and informants (Section 5.2.4). Considering the interpretivist nature of this study, therefore, its confirmability is essentially based on the connection between the reflexivity of the researcher and his ability to ensure that the findings are the closest possible result of raw data, ideas and experiences of interviewees, rather than personal viewpoints or biases (Veal, 2017). To reduce and minimise further the investigator's bias, the study should indicate 'how conclusions and interpretations have been reached' by providing rich detail of informants' quotes that generated each theme (Nowell *et al*, 2017:3).

In this study, the researcher enabled informants to express their ideas, experiences, and opinions openly and with minimum intervention during interviews, apart from clarifying acronyms and/or technical words. The systematic analysis and interpretation of findings was consistently placed under examination. Across the entire investigation, and at every of its stages, all decisions were pondered by the researcher in relation to any bias, personal value and belief acknowledged in the study (Miles and Huberman, 1994). With an open-minded and self-critical attitude towards the collected data and their analytical outcomes, the research was designed, structured and described in detail through a constant critical review to face any potential pitfall throughout the methodological procedures presented in relation to the dependability and credibility criteria. Confirmability can be achieved, in fact, when credibility, transferability, and dependability are all attained (Guba and Lincoln, 1989: Nowell *et al*, 2017).

5.6 Authenticity and ethical considerations

Within constructivism, as a clear distinction from the positivist paradigm, Guba and Lincoln (1989) advanced authenticity as the principle based on fairness and negotiation between

all people involved in qualitative inquiries to make sense of the investigated phenomenon. Considered more as an extension of the trustworthiness criteria (Schwandt, 2014), rather than an additional principle, the principle is based on the elements of fairness and balance, ontological, educative, catalytic and tactical authenticity (Lincoln *et al*, 2011; Johnson and Rasulova, 2017).

Fairness and balance concern an open negotiation between people involved in the study (researcher and informants) for a construction of meaning for the value creation process in smart destinations generated from the different individual belief and value systems. This issue was recognised and demonstrated in all the methodological procedures of this study, from the selection of participants (Section 5.3.4) to the collection of data through different interview guides and heterogeneous secondary data sources (Section 5.3.4) as well as the systematic analysis of primary and secondary data (Section 5.4.1). The broadening of the respondents' understandings has been referred to ontological and educative authenticity in terms of respectively enhancing the awareness of self and others' viewpoints (Manning, 1997; Shannon and Hambacher, 2014). The dialogical conversations with interviewees, in this research, were characterised by an explicit interest of respondents in knowing more of smart destinations and value creation (Appendix 13), with few interviews lasting longer (1 hour) than expected/planned (30 minutes). Furthermore, the summarised results of the research will be sent to all participants in the study (Table 24), with the intention to keep the conversation open for potential further investigation in the same domain of research. Also, the level of actions prompted by the findings and their interpretation defines the tactical and catalytic authenticity when empowering participants and stakeholders with practical knowledge as joint construction beyond the research itself (Collins *et al*, 2013; Shannon and Hambacher, 2014). Given the diversity of participant organisations and the different roles of the key informants interviewed, they might act as catalysts for the dissemination of this research findings (knowledge sharing) and for exploring multiple potential opinions on the implications of smartness beyond the Oxford Road Corridor context. Apart from the dissemination of the study to increase accessibility (Manning, 1997), the participation of interviewees and local stakeholders in workshops and seminars will be essential to the co-construction of additional interpretations and negotiation of the course of future actions concerning the smart development of Manchester (Collins *et al*, 2013). As such, these kind of catalyst and tactical initiatives are meant to be organised

within and outside the smart Corridor to broaden the different beliefs, meaning and views towards the value co-creation process, its components (i.e. data, ICTs and knowledge) and needed actions thereof.

The interaction with people is peculiar to qualitative studies. People are the repository of information about the topic under investigation as well as instruments for the collection and analysis of relative data. As reported for data collection strategies (Section 5.3.4), they have the right to be informed about research procedures, refuse participation in the study at any time and maintain confidentiality, privacy and anonymity. Actually, interviews and observations may entail ethical issues requiring specific attention before written informed consent agreement is obtained. The value creation in smart tourism destinations was not qualified as an overly sensitive or contentious phenomenon and the fairly low number of interviews did not raise any particular ethical concern. Yet, qualitative researchers have to deal with ethical challenges and issues throughout the entire research process (Flick, 2008) and ensure that the research design is 'methodologically sound and morally defensible to all those who are involved' (Saunders *et al*, 2009:184). Despite the adoption of formal code of ethics (Saunders *et al*, 2009), there are issues attaining the researcher's neutrality, data protection and the impact of the study on organisations or collective interest that are more difficult to handle (Flick, 2008). By adhering to the ethical and research integrity guidelines of Manchester Metropolitan University, an Ethics Checklist was completed and approved before collecting and analysing data (Appendix 21). Interviewee's data confidentiality and protection was ensured by sequential coding (e.g. D1, D2, K1, K2) for each audio recording and interview transcript to avoid any identification of participants. Such an anonymised use of data also helped the classification and analysis of both primary and secondary data throughout the entire investigation. While primary data were kept secure in password protected devices, the sources of publicly available secondary data were cited through the study without reporting names, location, or any other sensitive information. All data collected were destroyed upon the completion of the research.

5.7 Chapter conclusions

The methodological choices and the research approach of this study is guided by a critical review of the literature on value co-creation, knowledge management and smart tourism. This review also encompassed the research methodology used in each of the above field

of inquiry. The contribution of the literature is addressed in section 5.2.3 to demonstrate the specific role of conceptual propositions as tentative assumptions. In epistemological terms, the social constructivist perspective adopted by this study is consistent with the theoretical underpinnings of value co-creation and knowledge management (Peñaloza and Venkatesh, 2006; Spender, 2008; Echeverri and Skålén, 2011; Edvardsson *et al*, 2018), including the most recent views of smart destinations ecosystems (Gretzel, 2011; Polese *et al*, 2018). The active and reflexive role of the researcher is presented in section 5.2.4. In harmony with the qualitative-interpretive research paradigm, the holistic single-case study was chosen as the most appropriate method on the ground of its suitability for enriched exploration and description of the value co-creation (unique phenomenon, non-replicable in other destinations) within the Manchester smart Corridor ecosystem (complex and real-life environment).

Semi-structured interviews helped in collecting primary data from the knowledgeable key informants selected among data managers, chief marketing officers and strategists within the Corridor (Table 24). To improve the richness and depth of collected data, two distinct and interrelated interview guides were designed, tested, and used (Table 23). Secondary data were collected from online material, ranging from social media to official documents and press statements (Table 25). The application of thematic analysis and coding strategy are common to both types of data, with secondary data analysis being complementary to primary data exploratory analysis (Figure 26). The codes, categories and themes generated from the combined analysis of primary and secondary data represent the higher level of the overarching analysis.

Chapter 6. Exploring value creation in the Corridor

6.1 Introduction

The major themes and sub-themes generated from the analysis of primary data findings (interviews) are presented throughout this chapter. Each and all of the following sections denote the major themes of the value co-creation process taking place in the Oxford Road Corridor. The same structured approach applies to the complementary analysis of findings in Chapter 7. The subsections connote the respective aggregated categories of the themes.

Beyond the help of theory-driven categories (Appendix 11) in guiding the initial generation of codes, not included in the primary and secondary analysis, the thematic analysis allowed the generation of the following six main themes through an initial open coding, before the use of *In Vivo* and pattern coding.

> *Value creation enablers* (Section 6.2), *value creation components* (Section 6.3), *service orientation* (Section 6.4), *value creation constraints* (Section 6.5), a*ddressing constraints* (Section 6.6), *contextual factors* (Section 6.7).

Each of the themes will be briefly summarised at the end of the chapter (Section 6.8).

6.2 Value creation enablers

Stakeholders engaged in technology-mediated and face-to-face interactions in the smart context of Manchester facilitating resources exchange (Gretzel *et al*, 2015b; Neuhofer *et al*, 2013). In terms of their role in underpinning institutions and institutional arrangements, the contextual factors will be analysed in section 6.7. At different levels and with different goals, interactions triggered collaborations and vice versa. Similarly, sharing practices were essentially guided by data, information, knowledge exchanges (including digital skills) and city events. With a clear distinction between such activities and other relevant facilitators of value creation (e.g. knowledge), collaborative interactions and sharing practices were identified as meaningful enablers of value creation in the smart Corridor.

6.2.1 Collaborative interactions

The high level of various inter-organisational interactions among participants was in line with a positive approach towards connecting with people and bringing together different sectors or technologies. There was a supporting view towards the engagement with local

stakeholders (e.g. the City Council) and users through events (e.g. conferences) and smart city projects. Several interviewees stressed the importance of being able to connect '*what is going on in Manchester*' (K6), '*people sharing data*' (K1) and people '*with those broader conversations* […], *to kind of leverage some actions*' (D1). A similar emphasis was given to the role played by technology in supporting interactions, which ranged from the use of social media for customers' engagement to mobile applications and wirelessly connected devices empowering access to data, information, personal interactions, and communities' engagement.

Interactions prompted different types of collaboration. The willingness to collaborate was widely expressed among participants coming together for various reasons and goals. While some of them engaged in collaborations to access resources (i.e. data, knowledge, finance and ICTs) or face the lack thereof (Section 6.6), others were more inclined to test and/or find solutions together to enhance services and for strategic purposes. As a data manager (D2) pointed out:

> *Certainly, in my experience everyone has been very open to sharing and just exploring stuff together. I'm meeting a number of firms; we had a series of meetings with them and actually decided it wasn't the best thing to do. But actually, we both really wanted to keep in touch, and we could find some other solutions that we may just pull together. Is quite good. There's definitely a drive, a dynamism around.*

With a strategic view of collaboration, instead, a marketing manager (K6) referred to how different partners

> can *collaborate to co-create visions of the future and how they could get, how they could work together to develop what we're calling the experience economy of the local region.*

The access to resources and their integration to co-create value was driven by formal and informal interactions as part of existing or new relationships with local stakeholders. Partnering and networking practices took place within and outside smart city programmes as CityVerve and business associations like CityCo. Participation in CityVerve was reported as an opportunity to work effectively together on "use cases" with citizens and companies, which, in some instances, resulted in collaborations extending beyond the smart city initiative. Similarly, some informants talked about their membership in the local business

associations enabling access to information and their business network expansion. In respect of this, a marketing manager in hospitality (K2) raised the benefits of collaborating with Marketing Manchester at operational level (transportation disruptions information to be passed to customers) and the marketing forums within the Manchester Hoteliers Association (MHA) in which '*managers will come together and discuss the challenges and then they get together to collective sales missions'.* Within the networked system of the smart Corridor, connections and collaborations with local institutions were also driven by financial resourcing:

> *we're very heavily connected to the city council; we are connected to the Greater Manchester Combined Authority where funding comes from* (K7).

Networking practices were also carried out in the form of occasional encountering during conferences or workshops held in open venues, like the Manchester Science Park, where it is possible to hang out '*there for a day just sitting idly wandering around meeting people, seeing what they're up to'* (D2), find something interesting and talk about that. These interactions outside the "closed" context of smart city initiatives were highly valued by interviewees, even if they did not necessarily turn into actual collaborations. Provided that weak and strong ties characterise the value networks of service ecosystems (Granovetter, 1973; Lusch *et al*, 2010), the flexible and heterogeneous approaches to collaboration and interactions identified across participants shows that 'the locus of value creation [has shifted] from inside the company to collaborative interactions that lie beyond the firm boundaries' (Frow *et al*, 2015:466). Whence the role played by collaborative interactions in facilitating the co-creation of value, along with the sharing practices.

6.2.2 Sharing practices

Data, information, and knowledge exchanges were identified as salient activities across all participants involved in sharing practices, with little evidence of content and experiences sharing. Interviewees showed a positive attitude towards such practices. However, sharing activities were addressed and carried out in several different ways. While the exchange of skills, competences and ideas occurred between organisations within an established or occasional network of relationships, the data and information sharing was mainly driven by the idea of '*how you return the data back to people*' (K1), '*giving people data*' (K4) and the release of information for mutual benefits (D1). The emphasis on data and information

denotes the need of market data (i.e. operand resources), such as footfall data, to improve services and co-create value (Constantin and Lusch, 1994; Lusch *et al*, 2007). Provided that '*commercial data is quite hard to share and people aren't very keen on sharing it*' (D2), organisations were more incline to share information than actionable data to create value. Following in-house processing, in fact, data were shared in the form of insights, analysis, reports and publications uploaded on proprietary digital platforms (e.g. clearinghouse) or the web and social media. These information sharing activities were commonly performed among participants in smart city projects:

> *I don't know if you heard about the CityVerve project. We were involved in that, so we trialled ways of sharing data or ways to possibly share data. We didn't get to the point of sharing data. We were really close to Transport for Greater Manchester in terms of sharing their data and the stuff they're doing around with smart technology* (K3).
>
> *We take that data which has been uploaded by any number of our different partners, which are all part of the CityVerve project. So, Cisco, B.T. they upload, Transport for Greater Manchester a great example. So, they upload data about traffic conditions or air quality or anything like that.* (K4)

or between organisations acting as customers in a commercial partnership:

> *We share the insights with those partnerships, but we don't necessarily share the data. We wouldn't say, Colston Hall is converting at 5 percent, while Bristol Old Vic is converting at 10 percent.* (D3)
>
> *…we upload that information to the platform to allow the Councils to try to predict what people are going to do.* (K4)

Within this exchanging of resources, the delivery of data and information to end users was deemed as relevant in terms of helping them to enhance their urban experiences, mainly in the case of tourists and citizens, or organisations' service provisioning. As stated by a marketing officer (K4), '*we developed the application to deliver all this kind of information* [i.e. traffic, events, weather] *to the consumers, to the citizens.'* Similarly, a data manager (D4) said that '*it's our job to provide data, provide reporting that helps other organizations to do their job essentially and to make decisions'.*

To a lesser extent, the same sharing behaviour upon data and information was applied to knowledge. As a result of shared learning across joint projects in CityVerve (e.g. arts and

smart ICTs workshops/community forums), knowledge exchanges were characterised by skills provisioning and the transfer of best practices. The attention was mostly placed upon sharing ideas '*for bringing visitors into the city*' (K2), knowing '*how you can best market to that country or to that visitors*' (K3) and finding practical solutions:

> *I was just also thinking about the piece of work that we've just done with the Greater Manchester Combined Authority, so GMCA, so helping them map out and what the digital landscape looks like across Manchester* (K6)

The significant aspect that emerged from such activities pertained the exchange of skills and capabilities determined by collaborative interactions outside smart city projects. The inter-organisational knowledge exchanges occurred through negotiations, presentation of projects results and joint development of ideas within shared context of interactions, as in the case of workshops engaging local communities (K4; K6). This was consistent with those information sharing practices defined as mutually related as a 'Spotify sort of demographic information' when referring to market knowledge (K3). Considering that the discussion on resourcing data, information and knowledge to co-create value will be addressed later in this study (Chapter 8), it is possible to notice that sharing activities presented here can be seen as enablers of value creation practices.

6.3 Value creation components

Data, information, technology, and competences (as knowledge and skills) were identified as the key resources underpinning value creation practices. Along with a broad orientation towards users' involvement, participant organisations showed an articulated view of the value creation core resources. Collecting and processing data/information were deemed relevant as much as the attention to open data and big data. The standpoint on technology embodied a positive attitude in enhancing connectedness and users' experience through a human-centred approach based on different types of ICTs. The need of competences to advance services and create value were found in practices aligned with the data and ICTs resources, with impact on the absorptive and adaptive skills. Finally, the involvement of users in the co-creation of value was recognised in view of the engagement of residents, tourists, and local communities in the process of developing services and solutions within and outside the smart city projects. Value creation practices emerged from the interplay between knowledge-based activities, data, and technology-based resources.

6.3.1 Data and information resources

Data and information were acknowledged as raw material to be collected and analysed for commercial purposes and decision making. Travel and tourism market data, mainly from digital sources like sensors, cameras, and Wi-Fi, were translated into information through processing activities to gain specific insights on the use of services and people's behaviour. With marginal reference to the use of national statistics, the data collected by stakeholders ranged from the basic profile of customers, for contact and billing purposes, to the number of people engaging with city attraction as events, and public arts. Such market data were translated into information and insights through analytical processes and practices. Data processing involved several distinct and yet interrelated activities encompassing: the filtering and slicing of audience '*dodgy data*' (D3); collate data (K1); '*linking different mix of data together'* as well as geographical data to demographics (D1) by using conventional software (D2):

> *You know, all we can do is business as usual stuff with it, you know, we can run it through that filter, running the spreadsheet, that Access database, whatever we want to do with it, get the answers we want out of it and that's fine*

Drawing out insights from audience, marketing campaigns, traffic and general destination data entailed the need of knowing the time people spent in the city centre, at the shopping centre or at the museum as well as the means of transport used and the origin of tourists. Working on analytics and integrating visitors and residents' data to find patterns in online and offline behaviours showed a propensity towards predictive analysis to aid commercial decision-making. As illustrated by a director of marketing within the cultural sector (K7):

> *[…] We do sort of use data to map where our audiences are located, look at the graphic, the nature of the audience to work out how to pitch that sort of fit with the programming and projects to them [..].*

Knowing the level of inclusivity of visitors and communities as well as the perception of the cultural offer was also deemed as relevant to integrated analytics:

> *we monitor the ethnicity of our audiences, because we want to know how inclusive we are and I will connect that information to data of the ethnicity of the community that surrounds us, so that we know our audience is disproportionately white compared to the ethnicity that surrounds us, that's not ok so we're working to change that.* (D1)

The value of open data and big data was largely recognised in terms of their potential, rather than their actual and effective benefits. As growing phenomenon, open data were associated with the feeding and retrieving of data that are free to be collected, shared and used by people to access information or by organisations to co-create solutions for citizens. Open data initiatives were highly appreciated by participants, with mention of the portal co-created by the MappingGM initiative with the help of local communities to map socio-economic and infrastructure data across Manchester.

> *we've got something called GM mapping, for example, generally we've been on, provides all sorts of information about Manchester and so open to everyone to share files and all that stuff and you can just get in there and have a play around with the stuff and that's really good.* (D2)

Conversely, big data did not draw the same attention. While just a participant pointed out that big data is less important than '*little data*' and essentially a '*buzzword*' (D3), others referred to it as something useful and yet to be realised to grasp its benefit (D1; D2). As growing phenomena, big data and open data need to be enabled by appropriate policies and smart technology to unlock an environment that facilitates the sharing and running of massive dataset. Despite availability of data warehouses and '*data mills*' (D2), Manchester still lacks a widespread open data culture and long-term data plans (K4; K5). The role of ICTs as technical enablers was instead identified in opening data through APIs and '*artificial intelligence used to all machine learning to parse with the data*' (D3; K1). For commercial or social innovation purposes, collecting and analysing data was linked to the robustness and reliability of the process.

6.3.2 Technology resources

The view on smart ICTs was generally positive, with some constructive criticism. Several types of advanced technologies were considered as tools enabling services and solutions in the cultural, transportation, media and public sectors. Wi-Fi sensors, for instance, were used by cultural organisations (e.g. museums) and transportation authorities (i.e. TfGM) to track road traffic as well as people movement within venues and across the city. Digital marketing organisations employed AR and geolocation to deliver content or information accessible by smartphones, cloud computing, website analytics and dynamic reservation

systems to collect and/or process audience data. Little criticism was raised against the association of existing technologies with the smart city concept:

> *I mean, your first thing you need to know about smart cities there's very little novel technology involved in them, apart from the artificial intelligence used to all machine learning to parse with the data. Smart cities are mostly about the application of technology that's really 20 or 30 years old.* (K1)

Informants referred to technology as a means to an end that is easier to be acquired (D1; D2). They focused more on the combination of different ICTs and their use in smart ways, rather than their cutting-edge attributes. Hence, the emphasis on seamless connectivity across multiple devices (web and mobile) and operating systems to market digital content and deliver information to users (K1; K3; K4). This view of technology as a tool was linked to the capability of connecting data (D1), connecting people (D1; D3) as well as enhancing users' experience and local communities' connectedness (K2; K4; K6). The smart use of technology was associated with a user-focused approach:

> *I would have preferred to see some of the investment going is not into clever tech, not into smart tech, but into some slightly sort of smart users of tech that's been around for 10 20 years.* (D3)

> *How could technology be developed for the benefit of citizens? How could it provide value for them, rather than just being technology development for the sake of it or being data collection for the sake of it, but actually trying to bring a human-centred approach to the project*. (K6)

Such a people-centred view aligns with the emergent Human Smart City (HSC) concept, in which 'people rather than technology are the true actors of the urban "smartness"' (Oliveira and Campolargo, 2015:2336). As such, smart technology was considered as the medium that lowers friction and eases the sharing of know-how:

> *APIs are just a mechanism for low friction sharing of capabilities and then the other worlds build on… that's only because the API have cut the friction out of the rest of it. Most Apps rely on about, I don't know, 20-30 APIs.* (K1).

Therefore, smart technology was regarded as an operand resource facilitating the delivery and access to data and digital content, connectedness, users' engagement, labour saving and knowledge sharing. As an outcome of human action, however, technology is also an operant resource (Akaka and Vargo, 2014). By acknowledging that '*technology can't exist*

without the human element' (K5), informants talked about testing, building and developing technologies (e.g. mobile applications and audience systems) with users and the need of technical skills (D3; D4; K1; K4; K6).

6.3.3 Knowledge and skills

In the form of skills and capabilities, knowledge was found key to value creation practices. The need of basic and advanced skills emerged alongside the existing capabilities of dealing with data and ICTs across the city, but also the widespread ability to absorb and adapt external knowledge for services enhancement. Given the role that data and ICTs play in the development of smart destinations, it is not surprising that proper competences are required in service and value creation practices. Data managers, for instance, stressed the importance of knowing how to collect and processing data and information to understand audience engagement inside and outside museums (D1) or '*how people move around the city centre*' (D2). They accordingly acknowledged their expertise in collecting and analysing data:

> *collecting data is in a way to tell a truthful and accurate picture is a specific skill, it's a particular set of competencies other members of the galleries not necessarily have* (D1)

> *if you don't really know where the data are coming from and how they're being processed and how they're being captured and you haven't cleaned them up, then you can make some really wrongheaded conclusions about how you're performing in a digital sense.* (D3)

Technology-related competences were given the same relevance by data managers and marketing managers with regard to the potential of smart ICTs or their development as result of human actions:

> *I think it's that link between the potential of a smart city and the potential of smart technology and the strategic interest of the city, and the city region and the institutions, so it's gonna connecting all these dots, I think that's the expertise* (D1)

> *And I guess that's a different kind of sector for development of knowledge and transmission of knowledge around Internet and technology and development stuff. (K6)*

The attention was placed upon the application of technical skills to create new services or enhance existing ones, whether they rely on traditional digital (search engine, social media

and mobile applications) or advanced ICTs (IoT, sensors and APIs). The community listing website supported by City Council, mobile applications for events, booking systems or box office platform for cultural organisations required such knowledge as much as for the so-called IoT as combination of different ICTs and sensors for tracking movements across the city. In this respect, interviewees addressed the capacity of organisations to absorb and adapt knowledge, whether associated with data, information, or smart ICTs, to improve business processes and services:

> *what's interesting about it is we're just now starting to understand how we can use that data and bring it into a day to day business as usual* (D2)

> *when you come around to doing new things, you can take those modulated sections of your application and reapply them into different scenarios* (K4)

Such capacity was mainly directed towards citizens and visitors through refining, updating and repurposing existing services, according to users' behaviour and expectations, or by building new solutions from scratch. '*Being able to create a platform which provides value to citizens' and* refocusing a city discovery service into a mobile application for events (K4), for example, went along with the adaptation of hospitality services to the huge number of tourists visiting Manchester (K2). As such, external know-how was generally recognised as determinant to the acquisition and integration of knowledge:

> *Whereas, you know, guys sitting in their bedroom or, you know, companies looking at trying something out, they tend to have more ability to try these things and just go, hey did you know that if you correlate this with that you get this you can you can predict that and then you know you're gonna buy the solution* (D2)

> *when we identify gaps, we either approach our network, might be local businesses or national businesses that we work with to see if they could help supply that content or support us in creating that content* (K3)

Even if few participants mentioned the contribution of national actors, such as consultants and universities, the external inputs to the development of know-how mainly came from local businesses, visitors, and residents.

6.3.4 Users involvement

The involvement of users in value creation practices was unexpectedly generated during the analysis and coding cycles. Even if this study does not directly involved users (tourists and residents), it appeared to be remarked by interviewees as an important aspect. In fact,

the participation of users in creating, enhancing and provisioning services was underlined in several respects. Regarding the wants and needs of users, the general orientation of the key informants towards their expectations was associated with the effective engagement of residents, visitors and local communities in testing and/or building solutions. The users' involvement encompassed the '*test of the idea with the customer*' (K1), building mobile applications with residents and visitors (K4; K5) and developing safer cycling routes services with local communities (D2). With a clear user-oriented approach to services, particular interest in enhancing experiences was showed by informants engaging users through focus groups, workshops and testing digital applications. This was associated with the empowerment of individuals and communities to make them active participants, with attention to:

> *[…] how would people potentially access or use those apps so that they could develop the functionality so it could best support that, rather than just developing a whole suite of functionality without doing any user consultation* (K6)

Working with local people as volunteers from a community was not only related to testing digital solutions (K5), but also improving public services, such as cycling routes, through communities' engagement:

> *[…] they went at all the boroughs and they said where that key route should be, where do you think this is, where are the key blockers to cycling in your area, you know, what's the problem and they had to…and people multiple maps*. (D2)

Such an involvement of users was found consistent with the prominent consumer-centred perspective. To benefit their customers, informants designed and implemented services by focusing on expectations to respond to users' wants and needs. Whence, the concern placed upon the collecting and processing of data and information, the use of technology resources and the application of knowledge to gain insights on visitors' behaviour, origin and motivations:

> *Yeah, we look at all of the competitors and we see how other people are doing things, and then we build our solutions based upon that, and then making sure that we are properly using a user focus.* (K4)

By lumping together tourists and citizens, key informants frequently addressed them as users and consumers with overlapping wants and needs. Such a holistic view, however, did

not exclude those differences in the use of services that are peculiar to each type of user, either individuals or public and private organisations. This was consistent with the user-designed services and their personalisation based upon the understanding of the overall user-journey online or offline as well as '*the importance of including the end user in the development of their products and services*' (K6). This is the case, for example, of tailored services for Chinese visitors (K2; K5) and cultural organisations (D4; K4). Whether designed for people or organisations, bespoken city solutions were implemented according to the specific requirements of users to co-create value. A similar orientation was expressed by interviewees toward the view on services and value creation, particularly in the cultural sector whereby one of the *key priorities is producing work that engages the widest possible community in Manchester, so there's an influence there* (K7).

6.4 Service orientation

Stakeholders showed a general and persistent orientation towards services. The service-oriented perspective has characterised the conceptualisation and actual development of smart destinations (Buhalis and Amaranggana, 2015; Jovicic, 2019), in assonance with the explicit conceptual view on services embodied by S-D logic and Service Science (Vargo and Lusch, 2004; Maglio and Spohrer, 2008). Service orientation was presented by participants through the existing strategic views of Manchester as well as provisioning and enhancing of services in the Corridor and city centre. Considering services as a result of interactions and collaborations between actors exchanging benefits (service-for-services) within smart destinations (Lusch *et al*, 2007; Boes *et al*, 2016), the significant role played by value creation resources and practices (data, information, smart technology and knowledge) is not comparable to the outlined standpoint on services. Service orientation was, in this sense, descriptive in nature and in line with S-D logic conceptual underpinnings.

6.4.1 Strategic view

The data and marketing managers highlighted the strategic development of Manchester by addressing the city marketing and promotional activities. The strategic perspective was linked to Manchester as an attractive destination for tourists and businesses through the creation of enhanced experiences and international positioning. This can be epitomised by the interest expressed towards the Chinese market:

> *at the moment we're going through probably a five-year cycle in terms of Chinese visitors and first of all making them more aware of Manchester as a destination and a gateway to the north* (K3)

While the attraction of businesses was linked to inward investments and jobs, the strategy around tourism was informed by the potential number of visitors coming to Manchester, their motivations and potential offering for them. A strategist (K5) contended that:

> *When they come to the city, how can we make them stay and spend money and help the economy? How can we make them have a good quality of life when they're here? How can we accommodate them, given that you've got a shortage of hotel rooms or we do have when there's a big event on…so...um, we're out of capacity?*

To raise the destination profile of Manchester, in line with the strategic goals, it is clearly important to consider both the physical (e.g. infrastructures) and intangible (e.g. culture) resources. Yet, the emphasis on improving tourists' experiences at the destination, and the discovery of the city, was embraced by stakeholders in connection with value creation practices components (Section 6.3). Data and technology resources were used to market and promote experiential tourism (e.g. cultural tourism) as much as knowledge and users' involvement in innovating and provisioning services.

6.4.2 Service provisioning

In service ecosystems, value co-creation entails the mutual provision of services between users and providers exchanging resources (Vargo *et al*, 2008). Identifying such a service-centred view in a smart destination requires addressing service provisioning approaches through data, technology and knowledge, as fundamental components of a smart service ecosystem. The focus across Manchester was placed on adjusting and shaping services, integrating culture into tourism propositions, diversifying offers and user-driven services. Data, information, and ICTs were an integrative part of this service provisioning approach:

> *We have clients who build services on top of our platform and then roll those services to their users and users manage their own data using our technology.* (K1)

> *Whether or not the app is the interface but at least to have some sort of integration and coordination system that both provides rich data for planning and provides useful information to citizens and tourists.* (K4)

This is in line with the *servitisation* concept, as 'the process of tailoring value propositions to enable consumers' greater efficacy in achieving desired outcomes' (Green *et al*, 2017:40). From S-D logic perspective, this process involves the active participation of users (Section 6.3.4), the (re)combination of data, information and ICTs resources (Sections 6.3.1 and 6.3.2) and the application of knowledge (Section 6.3.3) to create value. This is reflected in: the view of service as '*the glue that brings the partners together*' (K1); the integration of services on technology-based platforms or mobile applications and their adaptation for targeted visitors (K2; K3); the engagement of people and organisations at different level in diversifying transportation ticketing or in bespoke consultancy for cultural organisations (D2; D4).

6.4.3 Service enhancement

The viewpoint on services innovation converged around idea of better serving target users, improving experiences and making useful enhancements. When describing innovation as a slow and iterative process, participants mentioned the improvement of city services over time, the bundling of different services and the provision of alternative solutions. With reference to transportation services across Manchester, for example, a mobility manager addressed the flexibility and smart ticketing in the following terms:

> *if we find that it improves the experience of using the bus, which would do because the buses had turn up and then we can roll that out more widely across the city and we've created a lot of value within the city* (D2)

The ability to book services and access information in different languages and across any device, before or while visiting Manchester, was connected to data-driven and technology-based innovations. Participants provided location-based services examples, such as mobile applications to track and find events in the city (K4), along with quick access to information about direct buses routes and hotel rooms (D2; K2). Hence, the association of innovation with smartness:

> *when we do…do things that are quite innovative and quite successful, we are able to quite quickly bring a smart element through it.* (K5)

Thus, the *smart components* of innovation were actually linked to any improvement of experiences across the Corridor and the city centre, with reference to effective system of public transportation discouraging the use of cars or real time access to useful information

by people visiting, working or living in Manchester. The fact that 'services are now possible at an extraordinarily low cost' because of innovations (K1), however, was presented along with the slow process of innovation taking 'a number of years before it impacts' (K5). Yet, being innovative was deemed 'very very important" (K2) and based on iterative processes (K3) sustained by continuous improvement (K4) and experimental or testing activities (D2) that are mostly carried out with users (K6).

6.5 Value creation constraints

The constraints affecting the co-creation of value concern barriers, limitations, challenges, and issues presented against the use of data, information, technology and knowledge. The lack of such key resources was the common thread found in opinions and experiences of participants, alongside the challenges and issues mainly referred to data and information, ICTs, services enhancement, and smart city development. The shortage or complete lack of data, information and technology expertise emerged as one of the significant limitations to analytical practices and resources integration supporting value creation and services enhancement. The availability of ICTs (hardware and software) was less problematic than access, exchanges, and reliability of data/information, including open data and big data. Similarly, participants placed more attention to people and/or resources asymmetries and less concerns upon uncertainties arising from technologies and market changes.

6.5.1 Knowledge and skills constraints

The constraints associated with knowledge-based resources were strongly characterised by the lack of competences and skills. The inadequacy or scarcity of data and ICTs skills, in particular, stood out against broad knowledge-related limitations, which were attributed to the limited development of analytical skills and their poor understanding in arts and cultural organisations. To a certain extent, such a general view was reflected in the data skills shortcomings. Whenever data are available and accessible, the incapability of using them and poor analytical capabilities arose within organisations and across the city:

> *I think what's…what's really interesting is, just as I said at the start, how all this data might exist, but we don't know what to do with it.* (D2)

> *In Manchester, for instance, there's a massive gap in terms of analytics skills. There's a massive gap in terms of understanding.* (D3)

This knowledge gap was also recognised in terms of limited understanding of behavioural data, performance indicators and open data (D3; D4). Cultural organisations were mainly experiencing these issues because of the shortage of data managers or data literacy at any level (D1; D3), which is due the fact that '*they don't have training, they don't have budgets for skills development*' (D3) and thereby the required expertise is externally borrowed from other sectors. Underestimating data and information value as much as analytical skills was considered a matter of great concern for the city stakeholders (K1), even if the potential '*lock-in*' risk of specialised knowledge was presented as the main reason of not hiring a data manager (K7).

The concerns raised by interviewees on technology skills were essentially driven towards a limited diffusion of technical know-how at city level and across sectors. Data managers from arts and cultural organisations showed little or no knowledge on the technical side of data management (D4) and interest in smart city and smart technology as something that is missing and to develop on (D1) or the lack of basic digital marketing skills (D3). Broadly, technical expertise across other sectors appeared to be siloed and limited in its diffusion across Manchester. Despite the presence of '*an awful lot of tech firms*' (D2), the related know-how was deemed as compartmentalised:

> *How the travel APIs work well in terms of search engine optimization. Now a lot of those skills are in Manchester, but they're in different sectors, they're in the travel sector as opposed to tourism authorities or they're in the commercial sector.* (D3)

The problem of the heterogeneous and fragmented integration of individual technology solutions and smart city development issues (Sections 6.5.2 and **7.4.4**) could be connected to the uneven distribution of technology know-how. In fact, doubts were raised upon the actual development of an integrated city platform on the ground that there are not 'many people with the budgets and know-how to build it, not at a city level' (K1), even if that kind of know-how '*wouldn't be harder to acquire*' in Manchester (D2).

6.5.2 Technology constraints

Technology presented more challenges and issues than limitations and lack of resources. The technology involved in current smart city developments was considered as very basic or old, except for AI, machine learning and sensors to collect and analyse data. An effective

implementation of ICTs was the major issue presented by the key informants as influenced by societal and interoperability factors. Beyond the standpoint of technologists giving '*a technology-based answer*' (K1), the constant disruption imposed by the continuous and frequent technological changes was mentioned as a major concern:

> *[…] because especially travel and tourism move so quickly, from a digital aspect, it gets disrupted every month every year by new product or a new service that it's hard to keep up with that.* (K3)

From a technical perspective, facing such a challenge would require an integrated platform to make services run smoothly. Nevertheless, as evidenced by a marketing manager, this is still '*problematic*' and '*we're a long way*' from it (K1). The findings indicate that '*closed* [and] *compartmentalised*' systems and the lack of '*basic tracking technology*' (D3), along with '*cross platform negotiations*' and poor engagement with smart ICTs applications (K4), played a crucial role in preventing such developments. Similarly, hardware and financial constraints were addressed in relation to the technological limitations surrounding the delivery of services. The effective implementation, delivery, and engagement with smart technology-based services, such as AR and location-based services, requires smartphones with appropriate storage and streaming capacity as well as GPS accuracy (K4):

> *If somebody has an old phone with slow RAM, with not enough instant memory available on their mobile device, it will become very very slow and difficult to use. So, that's one technological issue. The biggest technological issue that we have found most recently is the accuracy of GPS location devices.*
>
> *[…] plus, there's also the limitation of money, you know, internal resource. So, we could make an amazing application that works on every mobile phone, we could test it on every single mobile phone. The BBC have a big warehouse where they test every device, and we don't have the resource to be able to do that. So, we have to assume that it works on devices.*

Financial limitations are particularly critical to small firms and not-for-profit organisations, like Marketing Manchester, which experienced costs as the '*biggest restrain*' driving their choices (K3). This has further implications for consumers that do not '*have the financial resources to be able to run it* [the service] *on multiple devices*' (K4), considering that some functionalities working on Android phone do not work on Apple's operating systems (iOS)

and vice versa. The impact of these constraints related to how people engage with ICTs-based services and the use of technology entails societal challenges concerning

> *trust in systems around the Internet of Things, around data, what things need to be considered when people are developing these systems and how can we ensure that people understand them and feel comfortable with them* (K6).

The approach to advanced technologies, including the problems linked to their use and implementation, can also result in data and information limitations or issues, since you cannot have data without the actual consumption of technology.

6.5.3 Data and information constraints

Dealing with data entails issues somewhat connected to the barriers and limitations arising from analytical and sharing activities. Participants identified data collection as one of the challenges, rather than a major barrier. A data manager (D4) referred to the hurdles of '*behavioural change*', when talking of data accessibility '*depending on whether it's the data doesn't exist or the data exists, but we're not allowed to access it*'. Another manager (D1) addressed the same issue from an analytical perspective:

> *accessing data in a kind of raw form that can be analysed by the researchers and joined to other dataset in a meaningful way.*

This is a challenge marked by a strong interdependence with other relevant challenges and issues in data management. In addition to the lack of data expertise (Section 6.5.1), which was one of the many issues affecting the effective collection and interpretation of data (D1), interviewees expressed concerns over the heterogeneity of data sources (D3), the '*old-fashioned*' way of using data (D3; K2) and the provision of information that '*might not be appropriate for everybody*' (K6). The attention was directed towards the difficulties of integrating and processing unstructured and non-standardised data coming from different sources, as a data manager (D3) commented on an integrated box office system data:

> *So, there are enough differences between them, when it comes to kind of integrating the data that could be a bit of a chance.*
>
> *it's doable but it's unnecessarily expensive, because there isn't that kind of one standard for a list. And it's the same for analytics as well. if you want to integrate the behavioural data and you don't have a standard engagement model and a standard measurement layer that sits on top of that, as well.*

These issues concerning data analysis were also emphasised by participants in the cultural sectors referring to small organisations that struggle more than the big ones (D4) and the problem of connecting the different kind of collected information:

> *we know where people come from in terms of whether they come from for domestic tourists, we know where, the countries they come from, but we don't really have a way of linking that information with other people* (D1)

Apart from overlooking behavioural data, structured data and their flows or gaps (D3), the impact of missing data on analytical practices was acknowledged as a major limitation. Participants, in fact, commented on the lack of data about travelling behaviour across the city (D2), footfall data (D1), audience and tourism market data (D3; K2; K7), with particular reference to their structured and actionable nature. As put by a marketing manager in the cultural sector:

> *I would say there are big gaps in data and data provision certainly where international business is a concern and I think that's a citywide issue* (K7)

The lack of access to existing data, as mentioned earlier, was a significant challenge that is sometimes hard to face:

> *The problem we have with the secondary kind, when they exist, we're not allowed to access it, because when that happens, often, there is no easy way for us to try and collect that data alternatively*. (D2)

Missing data also affects sharing practices, since it is not possible to share what you do not have, or you cannot access. The primary reasons preventing data and information sharing were essentially linked to the same factors precluding their access. With different views between marketing and data managers, the findings showed that organisations do not share "sensitive" data and information or are clearly less keen on doing so. Data managers noted that '*commercial data is quite hard to share*' (D2), because local actors '*might be partners in one sense, but also competitors at the same time*' (D3). Marketing managers, on the other hand, contended that some specific sectors, like mobility and transport, are '*less willing to share data, because it is more financially important to them than it is across other industries*' (K4) and when the information sharing occurs, 'it *usually ends up with hosting content suppliers or content users as opposed to smart data*' (K3). The same issues were considered as barriers to open data and big data. Alongside the lack of access to

actionable and structured data, the most important shortcomings were found in the need of a compelling business case, analytical limitations and overlooking essential technology:

> *I think my experience in some open data projects is that they're not that open as making things genuinely accessible, so, for example, the audience finder is all behind a paywall and it's close and I find that is just as a missed opportunity, really*. (D1)

> *I would like to get to like having a data store and city having a long-term plan for open data and then not. And the reason we haven't got that is the business case is not there for them. And I could probably make a business case, but it won't be compelling immediately, it requires a three to five-year plan* […] (K5)

> […] *at the end of the day there's no point in us having a lot of this data because we don't have the resources to analyse it in any real effective way or play with it*. (D2)

> *you get organisations who are talking about big data, but they don't have a half-decent analytics implementation on their site or they're talking about big data, but all they've got is a very poor-quality CRM without an information manager*. (D3)

6.5.4 Asymmetry and uncertainty

Participants showed more concerns over asymmetries among value creation components, than uncertainties. Uncertainties were raised by the '*competing objectives*' between public and private organisations (D3), particularly the ever-changing users' needs in relation to technology (D4). Different types of asymmetry were also associated with knowledge, data, technology, and social components of value creation. For example, the different audience tracking systems and the small versus large organisations' technology divide was linked to the gaps in data and information availability to cultural organisations (D4). The diversity of data format, 'structured in a similar way, but not exactly the same way', and the different ways of managing data was also making their integration more difficult (D3). Considering the strong relationship between smart technologies and data, any asymmetry in the latter impacts the former and vice versa. In addition to the above-mentioned tracking systems, the fragmentation and heterogeneity of platforms acknowledged in the smart Corridor, and broadly in Manchester, can be regarded as the source of both data and technology asymmetry:

> *At the moment, each city or region has its own proprietary infrastructure in place and they're different, which, from visitors' point of view, isn't always ideal* (K3)

> *On day one I started working with them, they had 47 different core technology platforms…core! This isn't just the universal applications they had, forty-seven different core platforms holding data, things like environment, transport planning…* (K2)

Similar concerns were expressed for testing capabilities asymmetries resulting from gaps in technology resources (Section 6.5.2), the '*different focus* [and] *different way of working*' on analytics across the cultural sector and the '*real imbalance*' in valuing data skills (D3). Based on marketing managers views, urban asymmetries were also considered in terms of historical inequality between '*rich people here* [i.e. Manchester] *and poor people*' (K5) as well as the gaps within the technology-based solutions offered by the city council and the capabilities required to fill them:

> *you'll see third parties coming in and saying we recognize a gap to do that and we're already seeing this, we can be the platform that allows the integration of multiple datasets and services on a geographic basis because we know that cities are not enough equipped to do it right now, and even if they are it's an investment priority.* (K1)

This kind of challenges in data management and service provisioning was also recognised in the differences between the Manchester transport authority (namely TfGM) long-term and the mid-term vision of local rail and bus companies (D2). With reference to the success of 'London creating problems for everywhere else', the strategic vision of Manchester as an attractive destination that could '*potentially create problems for the wider northwest or the wider north or the small towns*' (K5) was considered in terms of urban imbalances and a challenge to consider alongside all other asymmetries.

6.5.5 Other challenges and issues

The development of Manchester as a smart city was considered a challenge somewhat connected to services enhancement and urban development issues. From the technical perspective, the need for a massive transformation to be addressed at city council level requires efforts to achieve '*the level of advancement that needs to happen in order to create a coherent platform for a smart city service*' (K1). This view was in line with the need

to overcome the issue of providing services through an integrated platform for tourists, too:

> *I don't think there's a consistent enough platform or platforms that enable visitors to use it sufficiently across all cities they visit* (K3)

Yet, the common question of demonstrating '*what the scale of the opportunity for a smart city is'* (K1) was reported alongside the challenges and constraints specific to Manchester, such as the low priority given to smart city initiatives and necessary funding (K5):

> *I think it's fair to say they aren't the top of the Council's priorities list at the moment. So, within the local authority there are 7000 people and there's maybe 10 of us working, in some way, on smart city projects and most of those, if we hadn't got the funding for the project, there will probably be one or two people working on smart city projects.*
>
> *the challenges we face, as the city, are the challenges of the move towards the environment, the challenge of being a regional capital and the challenge of a successful city*

With respect to services, similar challenges were reported by participants who had to face the limitations in transport multi-operator and multi-mode ticketing due because of poor collaboration and flexibility (D2), small-scale data systems that cannot be expanded to big scale service levels (D4) and the potential impact of Brexit on recruitment and traditional approach to innovation in hospitality (K2).

6.6 Addressing constraints

Alongside the recognition of the limitations and challenges, interviewees offered several solutions to face value creation resources constraints. With particular concern over data, they suggested possible ways of addressing the problem experienced or that might be encountered when dealing with value creation components and other challenges. From the overall experiences and views presented by informants, themes were generated in relation to actors' behaviour, solutions about data constraints, the reliance on knowledge and skills as well as the emphasis on discovering, learning and creativity. Even though the proposed solutions mainly concerned data challenges or barriers, technology and skills constraints were distributed across all themes and categories. The "data solutions" theme was, however, generated through the findings linked to the lack of data/information and other challenges, like format and standardisation. While the "skills to face data challenges"

was the key category of the "knowledge" theme, other data-related solutions were found to be pertinent to "behavioural factors" and the "discovering, learning and creativity" as ways of addressing constraints.

6.6.1 Behavioural factors

The several types of behaviour were the most pronounced aspect among the approaches adopted by participants to address constraints. They consisted of behavioural changes as well as managerial and entrepreneurial approaches to data and service management, but also addressing data challenges through collaborations and personal interactions. With reference to people who hold and use the data, including customers, behaviour changes were suggested to stimulate the sharing of data and better understanding of their utility:

> *Behaviour changes very much, what we're interested in is, but it's not just the change of people they've been supplying the data at the end. It's also the change of the gatekeepers of the data and just try to encourage them to open up and share a bit more.* (D2)

While some data managers proposed the change of behaviour as an effective solution to data problems, others would have '*been pragmatic*' (D1) and dealt '*with the frustrations of not being able to access data or expertise*' (K6) by engaging in different forms of interactions and collaborations. The majority of responses were centred around personal connections to highly knowledgeable people, outside the firm, who might provide practical solutions that are not internally available or possible. Particularly in the case of data and information issues, knowing someone who can help or '*who knows someone who can make things happen*' (D2) was recognised as important as getting the information from participation in associations or partnerships:

> *I would speak to whoever I think of, whoever I can connect with to ask the question about whether I can access something and If I can't get it pragmatically, I'd move on do something else* (D1)

> *I mean you try your best to get the information from colleagues and partnership from friendships that you have with other people* […] *but it's never the same as going into a briefing that Marketing Manchester do every month, or the MHA, and having that city information* (K2)

In reference to collecting data and information through the "Audience Finder" platform, '*getting some key organizations into the program*' (D4) was presented as one of the many

approaches to face the lack of data and information. Further, direct connections to people within an external and personal network of relationships emerged as key to overcome data and skills limitations. The relationship with someone across different organisations and within a local or national network, in fact, was found to be a triggering factor in the actual search for a solution.

> *So, you give Laura a ring and she'll say, oh yes, sure, I'll give you a hand or I can put you in touch with someone who can do it. I think it relies very heavily on personal network; I think.* (D2)

The connections with universities or organisations outside Manchester were presented as the potential opportunity to rely on extended networks of relationships and how data and knowledge constraints were faced in case of local limitations. Although the community of practice concept was not explicitly introduced by interviewees, some of the key underlying tenets could be identified in the collaborative interactions at individual and social level (Duguid, 2005). Finding solutions through collaborative behaviours requires motivations to share and willingness to help each other as much as '*stop thinking as competitors*', which was identified as '*the advantage of the public sector*' (D3).

Still, different approaches were presented by marketing managers of not-for-profit, public organisations and private firms in terms of entrepreneurial or managerial behaviour. Firms in the hospitality and ICTs sectors engaged in trying something different, '*cool and quirky and see if that works*' (K2) or exploring opportunities and '*testing ideas with customers*' K1). Conversely, public and not-for-profit organisations tended more to be managerial and

> *rely on existing relationships or existing knowledge and data to do that. Yeah, I don't think we're the place where we can be entrepreneurial. I don't think we…well we do it historically…* (K3)

Yet, it was not possible to draw a straight line between such behaviours and approaches. Managerial activities were reported alongside entrepreneurial ones, as regards to an hotel high concerns '*about bottom line and cash*' (K2), the combination of brainstorming with the framework of '*vision and mission and business plan strategies*' (K6) as well as the '*70% managerial and 30% entrepreneurial*' balance within the same not-for-profit organisation (K3).

6.6.2 Knowledge and skills

The attention given to knowledge almost entirely concerned the capability of facing data challenges and the lack of data skills. In addition to the development of internal skills, the integration of competences available outside organisations was suggested as the potential and practical solution. To address data constraints, the creation of specific positions and roles in organisation or employing someone with the right analytical skills was recognised as a crucial approach:

> *So, a post specifically created to provide the capacity and the skills needed within the organisation to help people work with data, so I think that's a really big thing for cultural organisations. I think peers in the city that don't have an equivalent job, I have the only job of this kind, to my knowledge, outside of London, struggle quite a bit with having the time to collect data well and to interpret it once they've got it.* (D1)

> *what you need is to employ someone within your organisation who actually understand what needs, what this is actually about, who can then advise them and who can who can drive that stuff internally and that they employ the right the right person with the right skill set and the right abilities.* (D3)

The attention to internal solutions was mostly connected to people empowerment within the organisations, whether through the creation of innovation team (D2) or data literacy and analytical expertise development. Whenever such opportunities were not available or affordable, external knowledge and personal relationships were identified as the most convenient approach:

> *Is there's any way we can do this? more inevitably it's cheaper, so we can go actually we know a guy or we've got these three firms that offer solutions on that, maybe you should go out, you know, and talk to them about it and see which of those solutions are best for you*. (D2)

This response to the lack of data resources and data knowledge was commonly considered as complementary to internal capabilities, rather than a prime solution in addressing those issues. This holds true for the interviewed marketing managers who referred to looking for any '*research from somewhere else*' (K6) or if they '*could not do it internally or through our stakeholders or network then we probably want to go and outsource that production creation*' (K3). The external focus on relationships and skills was not just a common trait of knowledge-based practices and inter-firms' collaborations (Sections 6.3.3 and 7.3.1), but also a pragmatic way to face data and skills constraints.

6.6.3 Discovering, creativity and learning

Creative thinking, discovering, and learning activities were presented as additional ways of dealing with the technological and knowledge-based constraints. The use of advanced technology-based services by residents and tourists requires learning activities that the interviewees recognised as crucial to improve their experience of the city and the service

> *"Bees in the City", an exhibition that's just come out today and everybody loves it 'cause it's another way for you to learn more about your city and experience it.* (K4)

> *You have to learn about it every time you go to a city, which, I guess, is part of the joy of going to a new place is learning how to navigate and use what's around you* (K3)

Even if the users' perspective was not included in this study, the informants recognised it as one of the relevant aspects to be considered in value creation practices (Section 6.3.4). Given their entwined relationship between learning and knowledge, any improvement in learning how to use AR or location-based services to enhance the city experience can result in knowledgeable users helping providers in facing technology and/or knowledge-related constraints. Similarly, from the providers viewpoint, "*discovering*" trajectories can provide answers or solutions to value creation challenges and issues. This could be related to the development of services or the relationship between people and technology:

> *tourists and citizens are close together in the city discovery world, which is the one that I'm trying to talk to you about, because that's what our application focuses on* (K5)

> *we did walking tour, just a very simple walking tour around the Manchester Oxford Road area and exploring with people areas where those kinds of cameras installed and surveillance* (K6)

As such, informants reported serendipitous discoveries as interesting potential solutions to data and technology challenges:

> *It is time to go score oh look I've got a day this week, I could just play with the data I've got sitting on my system and see what interesting things I can come up with*. (D2)

> *The interesting thing about the events format, we actually stumbled into it, as part of CityVerve […] we were trying to get the number of people to join, to sign up, so we started working with Chinese New Year and Pride Parade and*

Christmas markets, and what we found is, you've got 10,000 people were going to an event (K4)

The idea of engaging in creativity and creative approaches to face the issues and challenges presented by data and ICTs was embraced in terms of '*having the potential to stimulate new creative thinking, their creative work and the strategic thinking*' (D1), the ability to '*create with that* [limited customers'] *information*' (K2) and '*respond in artistic or creative ways* […] *in the field of digital arts and digital arts creation*' (K6). Such a way of looking at problems and issues appeared to be consistent with an entrepreneurial behaviour (Section 6.6.1), without any specific reference to actual constraints to be addressed.

6.7 Contextual factors

Within the Manchester service ecosystem, namely the smart Corridor including city centre, the analysis of contextual factors revealed beliefs, attitudes, perceptions as well as formal and informal practices, rules or norms that can affect the co-creation of value. Findings showed a range of beliefs derived from general and specific opinions about Manchester as a smart destination, the collaboration among stakeholders as well as data and information. Formal practices, rules and laws were identified in relation to data protection (e.g. privacy), competition and inter-firms contractualised relationships. Besides, the informal practices encompassed recurrent behaviours, or better habits, alongside implicit rules and norms influencing collaborations and partnerships. Attitudes and perceptions were particularly directed towards the openness of the city and its local stakeholders, as well as smart city programmes and policies adopted by Manchester.

6.7.1 Beliefs

Drawing on their personal and professional experiences, participants expressed opinions, feelings and attitudes towards value creation practices, services provisioning, and the city context in which they take place. Such beliefs regarded an element of the value creation enablers (i.e. collaboration and data/information sharing), a triggering component of value creation (i.e. innovation), the competition affecting resources sharing practices and the smart ecosystem characterising Manchester.

As previously analysed (Section 6.2.1), collaboration requires interactions, engagement, and the willingness to work together at individual, organisational and destination level. In terms of beliefs, however, this was addressed as a double-sided aspect. Along with the

positive feelings about the collaborative environment of Manchester, a critical concern for effective collaborations across city actors was also revealed. A data manager referred, in particular, to '*the nature of the beast [that] does have an impact*' and '*the society that we live in*', when discussing about the lack of deeds following collaborative intentions, without discarding the '*vibe'* characterising the city (D2):

> *I don't know if that's a Mancunian thing or it's just a general thing. But I think any of those conversations will have that same sort of vibe. I think that's where the seeds get planted to try stuff and work together and you get used to work together, so you trust each other*.

This trade-off in working with other organisations was expressed by other interviewees, who '*could not possibly get everybody in*' (D4) or collaborate with big players like Cisco, '*even if it doesn't fit into the core function of the application which has set up in the original business scope*' (K4).

The view on data and information was guided by assumptions and dilemmas concerning issues and challenges, thereof. While the assumptions mainly regarded the lack of both data skills and information sharing, dilemmas pertained the interconnected relationship between the development of a mobile application, users, and data collection:

> *When you don't have enough users? How do you get the data? It's chicken and egg. How do you have enough users to build an application, but you need an application to get enough users*. (K4)

Together with such a marketing paradox, a marketing manager informant showed a high degree of certainty upon information sharing limitations by pointing out that '*people are extremely cautious about sharing information about their own business*' (K1). By showing similar strong beliefs, two data managers acknowledged that '*we're still near the beginning of a data-driven journey to make things better*' (D2) and assumed that the shortage of data expertise within cultural organisations across Manchester could be '*the same everywhere*' (D3).

By defining Manchester as culturally driven, international, diverse, and attractive, some of the key informants (K2; K4; K5) shared their common beliefs about the city. Even though Manchester is the second most visited city in England and third in the UK (Visit Britain, 2019), it was not actually recognised as a tourist destination:

> *You say we're a tourist destination, we're not, actually. We're not listed as a… I was speaking to a colleague last week who says, people come to Manchester for many reasons and do touristy things when they come here, but they don't come here as a tourist… yeah yeah, they come for business* (K5)

This kind of believing, however, was underlined and clarified in terms of the strong leisure offering of the city:

> *What I believe is that we have various demographics coming into the city for particular things, you know, for concerts, for festivals, for shopping* (K5)

Nevertheless, the notion Manchester as urban ecosystem was widely embraced with great confidence by many interviewees. The potential of developing a smart city, as a networked urban ecosystem, was recognised in the ability of connecting all the strategic components and the creation of value through the combination of different capabilities:

> *I think it's that link between the potential of a smart city and the potential of smart technology and the strategic interest of the city, and the city region and the institutions, so it's gonna connecting all these dots* (D1)

> *that is just the demonstration of the value of building things on the network rather than a monolithic basis you can build very quickly by combining the knowledge of multiple form of sources, capabilities, services form of sources* (K1)

With reference to the city as '*multiple kind of space*' (K6) and digital ecosystem, the holistic view and the enhancement of services received great consideration in the matter of value co-creation and smart city projects:

> *we're using the assets of CityVerve, the data and stuff like that to encourage development of an ecosystem of new services*. (K5)

> *So, if everybody does push this data and allow everybody to take more holistic view and approach to the ecosystem, that is a city, yes, you can garner a lot of information about how to improve that city.* (K4)

6.7.2 Formal practices, rules and laws

Value co-creation processes in the smart Corridor could be defined by practices, rules and laws increasingly recognised by S-D logic literature as the foundational facilitators of value cocreation in markets and elsewhere' (Vargo and Lusch, 2016:6). Along with beliefs, norms and symbols, these institutions and institutional arrangements are also viewed as socially

constructed aides to collaboration and service innovation (Akaka *et al*, 2019). Apart from complying with the rules and laws required to access funding, interviewees extensively referred to formal practices and arrangements enabling or restraining different types of relationships as well as the use of data and information:

> *I guess in terms of starting new relationships, probably most of it is quite formal in terms of, like a membership is quite a formal rule (K3)*
>
> *if you're starting up projects and things, that would just be a case of signing collaboration agreements with people (K6)*

This kind of formal practices were described as '*firmly written down* [and] *contractualised*' (D2) as well as '*organised and structured*' (K3) forms of agreements to '*setting out your ways of working that you would approach*' (K6). The effective business collaboration and partnerships in projects were strongly associated with explicit, binding, and legal contracts:

> *It's only when it comes down to the hard-brass tacks, the actual writing of contract stuff you'll start supposedly doing stuff. Err…so again, I'd say that's actually…, when you get down to the final level it's quite firmly written what you can…what happens* (D2)

Likewise, participants talked about formal practices, rules and practices involved in the use and sharing of data and information. In the light of data protection rules and privacy laws, such as the General Data Protection Regulation (GDPR), they showed profound prudence and concerns towards the data and information access and management. When referring to the collection, processing and sharing practices, both marketing and data informants showed a great awareness of data protection laws and attention to sensitive commercial and personal information. Given the importance of doing '*all of the things* […] *in line with the GDPR*' (K6) and the fact that data is a '*very codified area of work*' (D1), particular concerns were directed towards running '*massive dataset* [and] *doing it within the law*' (D4), asking for '*permission to share data from trials or from other suppliers*' (D2) and ensuring that '*data is generally anonymised on platforms*' (K4). These practices appeared to be a crucial component of the relationships with other actors and partners, especially in terms of sharing sensitive data and information:

> *Even between personal information and commercial information or things which are not to share for various other reasons, you've got quite a lot of*

data is blocked out for that, therefore you have to be quite explicit saying you will not share it with each other. (D2)

To a certain extent, complying with data protection regulations clearly implies limitations in sharing activities and affects collaborations on the ground of formal contracts. This was utterly acknowledged by a director of marketing (K7) in the following way:

Well, yeah, obviously GDPR affect the way we can communicate with people, and also the way we can share data with people that we're working with, which is…has quite big impact…

As stated by another marketing manager, '*you sign terms and conditions and how we build those relationships and what happens afterwards'* (K3). Keeping data safe and their sharing is, thus, explicitly entwined. Since '*you wouldn't be able to have an open platform, unless you have a million of Ts&Cs agreed to*' (K4), the implications for open data can be easily assumed. In addition to the significant role of formal agreements and data protection rules, participants recognised the impact of market rules on data sharing and collaboration. Competition laws were identified as the main rules limiting the exchange of data and the level of collaborative relationships:

If you take, for example, let's say, Radisson blue, the hotel chain. Do you really expect them to give the Marriot, one of their biggest competitors, a full list of everybody who stayed at their hotel, on what days, on what time? (K4)

in their defence, the bus companies would quite happily point out and quite rightly that they can't collaborate or they're not allowed to by competition. So, they're not allowed to. (D2)

With distinction between the private and public sector, several informants referred to their respective industry as being characterised by competition and collaborations within which organisations are careful about what they exchange and talk each other about. As noted by a data manager (D3), public organisations, '*like the council or all large organisations like Marketing Manchester*', might '*have also competing objectives in some ways*' preventing or restraining information exchanges. With specific reference to public transportation, for example, market competition was also deemed as a constraint to data and information sharing, collaboration, and governance:

When you talk to TfGM, you can talk to them about Stagecoach and First and how they don't want to share data, they're competitors! (K4)

It all becomes difficult. And then there's also other issues as well like, say, for example, I mean it's hypothetical, but say that one bus company said they get involved then one bus company said they wouldn't get involved. Are we then prioritizing one bus company by involving them in a mass solution and making them more... more attractive? as a state body it starts to get complicated. Is that anti-competitive? is it state aid? is it….? You know, all of this comes into play because we disaggregated and basically dissolved all links between business and lots of different firms and it becomes much harder, in a way you've to get all or nothing to get anything to happen and the much easier option, of course, is nothing to happen, because anyone wouldn't do that. And also, there's no driving…. there's no singular vision. (D2)

Provided that '*Manchester buses are deregulated transport and privatised*' (D2), the private companies running the local transport services might engage in aforementioned practices of contractualised collaborations, comply with the market rules and data privacy laws as well as their challenges and limitations.

6.7.3 Informal practices, rules and norms

Informal practices, rules and norms could be considered as implicit structural features of the Manchester service ecosystem within which value creation processes take place. In contrast to formal practices, rules, and laws (Section 6.7.2), they were representations of collective behaviours and activities carried out and recognised by participants when dealing with value creation practices and collaborative interactions. Apart from very few traditional habits concerning the '*traditional way of doing things in the hospitality*' (K2), two intrinsic features emerged from the findings: data management norms and informal collaborations. A common and implicit standard way of dealing with data were presented in terms of '*being careful when you're using the data*' (K1), collecting '*information that is very restricted in hotels, because it is always needed to be that basic information*' (K2) and following shared criteria:

Some organisations [...] set a certain kind of norms around that sort of thing. So, with the survey data it has to go to people survey has to get people who they know have attended within the benchmark year it goes up by email to people like visited or it goes up it needs to be a face to face kind of interview format. So, we don't allow self-completion, for example. (D4)

Informal relationships were deemed as normal ways of collaborating among participants. In Manchester and across the different sectors involved in this study, tacit collaborations were commonly experienced through direct, indirect, or occasional interactions occurring at various levels. Such practices, for instance, ranged from '*bespoke consultancy* [that] *isn't standardized*' (D4) to '*team-by-team informal arrangements*' (K3). Further, the city context provides the opportunity to engage in such informal activities:

> *I can come across the same organization, say in Manchester City, really frequently and it might be a completely different meeting or scenario each time*. (D4)

> *There isn't really I think a formal process that we follow for developing projects ideas or potential partnerships with people* (K6)

> *I think is…what you see is things like, you know, media like Manchester Confidential…you're connecting people sharing data…and research companies like CGA Peach, they're providing F&B data and partnerships between football clubs or entertainment venues and hotels and travel providers. It's a very organic informal network. I don't see much of a sort of formalized collaboration.* (K1)

In this organic informal network of collaborations, however, it was recognised essential the fact that '*there is a level of trust and implicit*' (D2) cooperation, particularly in relation to sharing practices:

> *I think because a lot of the sharing is dependent on relationships and that will to collaborate, that's much more implicit, that's very rarely written down*. (D2)

Considering that such informality might also '*depend on who* [you are] *working with*' (D4), this view appears to be consistent with behavioural factors based on personal interactions to address value creation constraints (Section 6.6.1):

> *When I used to work for a digital agency, if I needed someone who was an expert in a particular programming language, I could ring up the trade body and say here in Manchester who has this skill set. But by and large these things are much more organic*. (K1)

6.7.4 Attitudes, viewpoints and expectations

Gaining insights from the attitudes, viewpoints and expectations of participants could help in making meaning of those institutions and institutional arrangements characterising the smart service ecosystem of Manchester. While the viewpoints and expectations might be respectively referred to the current frames of reference and future perspectives, attitudes could be defined as positive or negative responses to social constructs and other stimuli

(Fabrigar and Wegener, 2010). Despite the findings did not reveal such a straightforward distinction in terms of codes or categories, positive and negative were found within larger themes. In this sense, the attitudes, viewpoints and expectations of participants converged around three categories: openness, the urban agenda and smart city projects.

In connection with favourable opinions about open data (Section 6.3.1), a positive attitude towards openness was expressed by data and marketing managers. The benefits of being open were presented by a data manager (D2) in terms of the opportunity for small firms to interact with public authorities or larger organisations, participate in trials or bids and win them. Provided that Manchester '*had a reputation for being open to innovation*' (K5), with open access to data and knowledge could be possible to innovate and take advantage of that:

> *I think there's much of that data as possible should be open to enable as many brains as possible to play with it, because, you know…who knows what's been…who knows who is going to find the next big thing or the next little thing.* (D2)

Openness was also perceived as 'opportunity to try things out and do things a different way' (K2), while others considered tourism as '*a very open industry*' as much as Culture, which '*is very open, because they're willing to share, because it's not so financially driven as, for example, mobility*' (K4). From a technical perspective, instead, standardisation and the use of APIs were recognised to be crucial to effective openness:

> *for a lot of these organisations, if they want to be opening stuff up through APIs, if they want to be going big, they need to get fundamentals right. They need to get the structures right*... […] *There are standard for all those things, and you have the standard for openness which is, you know, you have an API and then you open this stuff up.* (D4)

The viewpoints concerning the urban agenda were mainly centred on a set of priorities that include residents, before '*visitors and people working in Manchester*', and the reduction of '*some of the effect of having all these people in the city*' and cars, while the expectations in the medium-long term were placed by the City Council upon smart city developments (K5):

> *we're very engaged on a policy level. We are very engaged on, I suppose, an intellectual level of helping to frame the debates around smart cities and to be represented in those conversations. But I think it's fair to say they aren't the top of the Council's priorities list at the moment.*

In contrast to the low priority set for the smart city development, all interviewees showed a great deal of interest and expectations about recent and future projects. As a two-year project aimed at demonstrating and testing smart technology services in the Oxford Road Corridor, CityVerve was recognised as an open platform enabling collaboration to '*scope out* [...] *different use cases*' (K4) and '*upload datasets* [to] *create Apps*' (D1). Some of the use cases mentioned by participants included:

> *Everything Everytime*, [...] *in the first year of the CityVerve project, as an artwork* [...] *connected to the API of data streams within the city* (K6)

> *the Manchester plinth project where you're learning and enjoying an item when you scanned it and it's a very augmented reality* (K4)

While someone focused on the '*interesting bits of innovation around how who gets to make those decisions and how the data is shared*' (K1), another tried '*to bring a human-centred approach to the project*' (K6) through

> *that sort of questioning, not process, but that sort of questioning mindset the project, sort of thinking about, well, actually what is the value that we're trying to create here? How could this, you know, how could technology be contrary? How could technology be developed for the benefit of citizens? How could it provide value for them, rather than just being technology development for the sake of it or being data collection for the sake of it* (K6)

From the innovation and technical perspective, other marketing managers agreed upon the fact that the level of implementation of smart cities is still far from seeing the actual benefit for residents and tourists:

> *The level of sophistication of most smart city projects are very very basic and very very simple they're not very integrated. The level of benefit they've been able to demonstrate is quite small so far, or rather there's been some great demonstrations between small niches*. (K1)

> *We've got lots of initiatives and projects to start to test smart tourism, CityVerve example or TfGM activities. I don't think it is a stage where could be widely used by that sort of types of visitors. I think younger visitors and younger audiences, young people, probably are more willing to take a risk or use new platform devices to get information or navigate around the city*…(K3)

In terms of constructive criticism, expectations of continuity and permanency of smart city projects was raised in contrast to the '*huge appetite for smarter city*' (K1) and the eagerness

to participate in '*making Manchester a better smart city*' (K2). As posited by a marketing manager (K3), '*I like CityVerve, but it needs to be more permanent to put smart tourism infrastructure in place*' and with attention to the financial impact:

> *Definitely, because we don't have huge amount of money to invest in new technology, so we want to create something, tap into CityVerve and I need CityVerve to be there all the time... If it finishes after a year, then I just can't find spending money on something that's only a year long*

However, as another marketing manager explained, such continuity was ensured through a similar EU-funded project using the same platform of CityVerve:

> *From a smart city point of view and a tourism point of view, there are other government led projects, which will continue the work that CityVerve did. So, Synchronicity is going to be a new one, that is a big EU project that uses the same open source platform as CityVerve. [...] funny enough it happens to be the same platform that CityVerve, which is about the testing and the concept developed*. (K4)

The urban agenda of Manchester is strongly characterised by the development of the smart city agenda, as emerged from the findings, with a strategy mirroring the transport, energy, health and social care as well as the cultural and public realm core themes of CityVerve. The recent SynchroniCity project can be deemed as a recognition of this strategy towards smartness. But, '*making smart cities useful for the people who live in them and work in them*' (K4) requires attention to the effective integration of the individual solutions and the value created for residents and visitors, as suggested by participants.

6.8 Chapter conclusions

Primary data findings were analysed throughout this chapter, with detail for each of the high-order themes. Following an interpretation of the findings that is consistent with the research questions and objectives of this study, the value creation process is connoted by its contextual, enabling and restraining factors characterising its meaningful elements (themes). Such a detailed exploration and analysis of the phenomenon was initially guided, but not limited, by theory-driven categories (Appendix 11). The iterative coding process, in fact, elicited a different and new categorisation of findings. The following categorisation of findings guided the analysis of secondary data.

Collaborative interactions and sharing practices facilitate the exchange and integration of resources and, as such, they are recognised as *value creation enablers*. Different forms of interactions (in person and technology-mediated) enable collaboration among local actors and sharing practices involving the exchange of data, information, and knowledge.

Data, information, smart ICTs, and knowledge are identified as the central components of the entire process (*value creation components*). Despite being beyond the scope of this study, the emergence of a user-oriented approach towards the co-creation of value shows a view of the phenomenon in agreement with the S-D logic foundational tenets (Vargo and Lusch, 2017). This is also evident in the *service orientation* based upon service innovation and the strategic view at destination level.

The limitations, barriers, challenges and issues affecting the sharing and application of data, information, ICTs and knowledge, including the respective asymmetries and uncertainties, represent the v*alue creation constraints*. Along with specialised knowledge, data skills in particular, a different behaviour towards value creation components as well as creativity for learning and discovering new solutions help in a*ddressing constraints*.

The c*ontextual factors* corroborate the holistic view adopted by this study, in line with the service ecosystem concept built on institutions and institutional arrangements (Barile *et al*, 2017; Polese *et al*, 2018). While formal practices, rules and laws mainly influence access to actionable data (e.g. sensitive data protection) and collaboration (e.g. market competition), informal practices, rules and norms encompass habits and behaviours affecting tacit forms of collaboration and interactions mainly related to sharing practices and facing constraints. Attitudes and beliefs embody positive and negative standpoints and perspectives towards the openness of the city, the strategic views set by the smart urban agenda, the innovative, creative, and collaborative environment.

Chapter 7. A complementary analysis of value creation

7.1 Introduction

This section refers to the analysis of secondary data from different online sources (Table 25). By analysing the data collected from microblog posts (tweets), podcasts transcripts and digital news articles, the themes generated by the primary data analysis were refined, integrated and organised to inform the discussion of the overall findings (Chapter 8). The high-order themes generated by the analysis concerned the value creation enablers, the meaningful components of the value creation process and related constraints, alongside the elements addressing them and related contextual factors. In addition to the generation of the new major theme of *Innovation*, some differences were also identified in terms of sub-themes and categories connoting the themes that similarly resulted from primary data analysis and presented hereafter.

7.2 Value creation enablers

This section presents the key factors fostering the co-creation of value in Manchester. Even if the analysis generated the same major theme (value creation enablers) and sub-themes (collaborative interactions and sharing practices), the findings showed some substantial differences in the underpinning dimensions. Within the collaborative interactions theme, in fact, collaboration and partnerships evidences were identified as prominent and more detailed against those related to the interactions. Alongside the exchange of knowledge, data and information, the sharing of people stories and experiences were identified as an additional category of the sharing practices. In comparison to the sharing and interactions, the prominence of the collaboration and partnerships theme was mainly determined by the Oxford Road Corridor context, arts and culture, education as well as the major smart city projects, like CityVerve and SynchroniCity.

7.2.1 Collaborative interactions

The strong contribution of collaborations and partnerships to the definition of this major theme could be related to the collective actions performed at local and international level. With the exclusion of the interactions linked to the prolific use of social media, which were source of data for the analysis and not the subject of this study, interactive relationships converged towards '*consumers Interaction with #AR*' (ARVR), discussions about the role of

museums, science and culture and '*talking to the right person*' (CV) among the partners of CityVerve. Collaborations, in turn, appeared to be more detailed, diverse, and built upon partnerships and cooperation at local than international level. This was mainly recognised in the interrelated collaborations taking place within the smart city initiatives, education, and museums across the Corridor.

Museums engaged in partnerships with different primary schools and universities to co-create exhibitions, drama projects and support research about the impact of sustainable cultural initiatives, with the help of teachers and students as co-curators. The Manchester Museum, for instance, showed its '*love* [in] *collaborating with teachers on new ideas and resources for primary schools*' as much as welcoming scholars '*supporting research as to the impact of our @McrMuseum*' initiatives (MM). The Corridor, including city centre, were the context in which academic and industry collaborations could emerge alongside public and private organisations partnerships across different sectors (ORC):

> *Congratulations to all our partners in the Manchester Arts Sustainability Team @HOME_mcr @McrMuseum @WhitworthArt @ContactMcr @RNCMvoice*
>
> *@LGBTCentreMcr It was our pleasure, fantastic to hear about the valuable work you do - and your exciting plans for the future, we look forward to working with you to realise your ambitions*
>
> *Exciting times for the Oxford Road Corridor, @Bruntwood_UK announce landmark 50:50 partnership with @landg_group, significant capital investment planned to grow the knowledge economy and create high value jobs. #Manchester #InnovationDistrict*

Besides the attraction of investments and the retention of talents, social inclusion activities and the improvement of transport services were also driven by collaborative interactions among local players. This was the case of the participation of the "*Age-Friendly Manchester partnership*" in the "*Citizens of Manchester*" campaign by Marketing Manchester and the work of TfGM in improving the city mobility by bringing together local stakeholders and a wide range of audiences:

> *Thanks to @MCC_AFMTeam for featuring @citizensofmcr in its April newsletter. The work Elaine and her colleagues lead in making Manchester friendly to people of all ages is invaluable*. (CMcr)

> *A comprehensive behaviour change programme, across a wide range of audiences, will be delivered by TfGM in partnership with the local authorities.* [...] *TfGM will develop engagement programmes with schools and businesses to ensure that any infrastructure put in place is maximised locally*. (BL)

This widespread sense of collaboration pertained to the smart city projects, as well. With a clear distinction between the local focus of CityVerve and the Europe-wide SynchroniCity initiatives, the findings showed a strong propensity for working together towards common goals at international and city level. In terms of collaborative interactions, the differences were essentially centred around the type of relationships among the actors involved and defined by the distinct and consequential nature of the smart city programmes. '*Discussing of collaborative opportunities for a UK-Korea Partnership*' on the business development of immersive technology (ARVR) and inviting SME and Smart Cities '*to test #IoT service in #Manchester?*' (SCity) were examples of international collaborative interactions. The cities collaborating one another, and with communities, were, therefore, brought together by the aim of '*creating a #digital #singlemarket for #smartcities data and services*' (SCity). This orientation towards international relationships and collaborations characterised the city participation in other EU-funded smart city projects, like Triangulum, as part of the digital strategy of Manchester (Section 7.7.3).

Similarly, the collaboration among partners was key to Manchester's bid to win funding for the CityVerve project. As historical and intrinsic city attribute, the collaborative work of people, public and private organisations was expressed in terms of partnership (CV):

> *The importance of strong partnerships is something we've placed at the heart of what we do at Manchester City Council and has been a crucial part of our success, from early regeneration programmes in the 1980s through to CityVerve*.
>
> [...] *much of the consortium was built around the Manchester City Council partnership structure that was already there through Corridor Manchester, our partnership between the Council, University of Manchester, Manchester Metropolitan University, Manchester Foundation Trust, Bruntwood and Manchester Science Partnerships*.

In addition to the ability '*to collaborate with cities like Glasgow that are engaging in their own smart city projects* [...] *to bring a new dimension to the consortium*' (CV), such kind of collaborations within CityVerve involved resident-led partnerships as well as cooperation

between communities and companies of different sizes and shapes. Working together on city-scale innovations required higher level of partnerships to turn a large number of use cases into actual solutions for the benefit of visitors and local stakeholders. As noted by a Cisco's participant, '*it's all about the partnership, it is all about the 130 different business scenarios that we will put together*' (CV). Yet, the interactions that occurred in the steering committee, partner meetings and through digital media prompted the transformation of the relationship between providers and users. The change of view about predefined roles was guided by different types of collaborative interactions and accordingly described:

> *Sitting on the same table with Manchester city council or with the hospitals, not anymore as vendors. They were not the customer; they were the partner*. (CV)

Rather than the role played by actors involved in the project, connections, and willingness to exchange resources and ideas were therefore deemed as crucial to co-production of services and eventually the co-creation of value. Connecting activities were mentioned in relation to the need of linking CityVerve partners and '*more digital citizens to communities in their local area*' (CV), combining diverse partners, ideas and resources before working on actual solutions or simply '*connecting the unconnected*' (CV). Sharing practices were, to a certain extent, found to be connected to the CityVerve collaborative interactions, as for the exchange of information and ideas on technology or solutions (e.g. PlaceCal use case). In terms of value enabling factors, however, the findings provided more detailed evidences concerning the exchange of data, experiences, and expertise, within and outside CityVerve and other smart city projects.

7.2.2 Sharing practices

Along with ideas and learning, data/information and knowledge exchanges connoted the sharing activities. Findings suggested that participants in smart city projects were eager to share what they learned and the lessons that came out of the project through public events and digital media (workshops, conferences, and podcasts). Communicating the value of partnerships (Section 7.2.1), the involvement of people and communities in value creation (Section 7.3.3) and the role of ICTs (section 7.3.2) were some of the key shared aspects. As evidenced by CityVerve's participants, the exchange of information and data took place among organisations within the consortium and in the co-creation of smart services with visitors and residents:

> *When connecting to CityVerve Wi-Fi, visitors are greeted with engaging, swipeable cards that share relevant content and information from the venue and the surrounding community*. (CVWiFi)

> *The open source PlaceCal platform coordinates and publishes high quality event and organisation information in a variety of formats, creating a really easy to use central source of community data that's updated directly by residents*. (PCal)

Similarly, the exchange of knowledge and skills occurred in the context of Higher Education, as in the case of '*presenting PhD research at #ARVRMCR*' event (ARVR), and in the arts and cultural domain, with museums '*sharing collections knowledge and supporting evaluation of #ShabtisinSchools*' exhibition (MM), or in the field of transport and mobility:

> *Training will be held for all delivery partners as well as specific technical workshops covering innovative approaches including data analysis, making the economic case for walking, and cycling interventions, and how to approach street design*. (BL)

Unlike the sharing practices analysis generated from primary data analysis (Section 6.2.2), the exchange of people's stories and experiences emerged as an additional category. With the aim of triggering discussions, connections, and opportunities of collaboration through storytelling strategies, the sharing of stories of people living, learning, working or investing in Manchester mainly encompassed the arts, innovation and entrepreneurship. In addition to the provision of a narrative for the city's brand strategies, such shared stories of artists and talented people denoted the identity of Manchester as a cultural, collaborative, and innovative place (CMcr):

> *I've never been able to pinpoint exactly what it is about Manchester's state of mind as a city, as a group of people, but it is a place where people can do innovative things.*

> *The brilliant artist and sculptor @lazerian is supporting @marketing_mcr on The Manchester Garden -@ManchesteratRHS - and has now joined the ranks of the #citizensofmcr. Here's his story* [...]

Manchester was recognised as a place where it was '*great to share experiences*' of working with cultural organisations (MM) or 'investing in communities' (CMcr), which were also complementary enablers of value creation.

7.3 Value creation components

The main value creation components identified by the secondary data analysis included the knowledge, technology resources and solutions as well as local people and communities. With some differences from the primary findings analysis outcomes (Section 6.3), the data and information theme was not generated as in the exploration of value creation through primary data and the involvement of people and communities in the value creation process developed into a more detailed theme. The people and communities theme encompassed the engagement of local residents, communities and users, alongside the people-centred approach to smart city development. As suggested by the findings, the contribution of the technology components appeared to be more limited than skills and competences, which were prominently characterised by data skills and learning.

7.3.1 Knowledge and skills

The knowledge sub-theme resulted from the combination of collaborative, absorptive and adaptive capabilities with data and technology skills categories, with attention to the role played by learning aspects. In connection with the attraction and retention of experts or talented people and, in comparison to absorptive and adaptive capabilities, collaborative competences were found to be particularly pronounced. While the absorption of skills only referred to the conversion of learned expertise '*into a use case that finds his way into a major deployment like CityVerve*' or '*into a proper city platform*' (CV), the adaptive skills were associated with '*data-driven decisions*' at city level as long as collected data could be 'more visible to policy-makers' (OISSense). The collaborative capability, instead, presented detailed evidences of bringing '*this expertise to the table when it came to working with various public and private partners*' (CV) in terms of '*understanding the breadth of services*' in the public sector and '*the hundred and fifty or so businesses*' working together in the CityVerve project (CV). This knowledge was expressed in relation to obtaining funding and collaborating in new projects (CV), as for:

> *understanding what those businesses need and want at different stages of growth enables us to provide support services to lobby on their behalf for new infrastructure for additional funding and so on*
>
> *We've learned a lot more from working with those businesses in detail on this specific project than we knew before. And so we'll be able to take that forward in the work that we are still doing with Cisco in the Mi-IDEA centre*

> *in the bright building, you know, it's just a trusted location to take some of that stuff forward*.

Indeed, learning was presented as a collective and individual process enabling the creation of knowledge, or better, the experiential development of rich understanding and skills. In line with Kolb's (1984) learning theory, based on the acquisition and transformation of the experience into knowledge, some posts and comments concerned learning experiences at individual level. With reference to the CityVerve situated experience (CV):

> *It was quite a steep learning curve, but I now feel well equipped to be consulted on digital projects and offer lessons learned and best practice from my work on CityVerve* […] *what I've learnt in terms of benefit from my organization of my learning experience over the last two years is huge*.

At the same time, while recognising that '*learning is critical*' to achieve successful outcomes (CV), social learning was expressed in terms of learning '*a lot more from working with those businesses in detail on this specific project than we knew before*' (CV) and with reiterated reference to the learning curve:

> *this for us has been a learning curve for the last two years and we are seeing this as a huge potential of really changing the seeds of the future based on what we developed here*. (CV)

The findings, therefore, suggested that a smart city project, namely CityVerve, was a source of individual and social learning experiences, with potential implications for the adoption of an integrative approach to bridge individual and organizational learning and knowing in smart destination ecosystem (Chiva and Alegre, 2005). Considering the socio-technological context in which such learning took place, smart technology played the role of sustaining AR or VR-based '*immersive learning*' (ARVR), online social interactions (Section 7.2.1) and the integration of resources. At the same time, technical knowledge was acknowledged as result of on-the-job learning:

> *I understand so much about the business world as it exists around smart digital and IoT. that no amount of training could ever have given me*. [...] *it's born of practical experience, rather than technical understanding* (CV)

In terms of integrating resources, data skills appeared to be more relevant than technical knowledge. The capability of 'bringing lighting data with crime data on the same table and

see what is the link between them' (CV) is presented as an example of data integration. Furthermore, dealing with data and information produced by the use of smart technology required collecting and analytical skills to develop "*#data-driven city solutions*" (SCity) and '*detailed data mapping*' for '*#smarter planning in local government'* (SCMcr).

The opportunity to use insights to develop and design services meeting the need of users was also associated with the capability to collect IoT-based real time data as well as '*a broad range of anonymised sensor data'* at city level (OISSense). Yet, such skills were recognised to be dependent on organisational ability to create their own template and format of how to take diverse types of information, in the light of the technical infrastructure and the model adopted by the city stakeholders to drive the effective collection of data.

7.3.2 Technology resources and solutions

The findings suggested that technology played a dual role in the process of value creation. From the material perspective, different kinds of smart technologies were mentioned as resources supporting collaborative interactions and sharing practices (Section 7.2) and the engagement of local users and communities (Section 7.3.3), along with knowledge and learning (Section 7.3.1). The ICTs-based resources were, at the same time, associated with smart services and solutions for the benefit of providers and users.

In addition to several advanced ICTs resources, ranging from sensors to AR and VR, the IoT and the integration of technologies behind the platform of platforms notion resulted to be a significant asset:

> *The Platform of Platforms was a new way for partners to make connections that didn't exist before and bring new partners to the project through the open innovation challenges programme led by Cisco and MSP at Mi-IDEA in the Bright Building. (CV)*

> *How could fixed and mobile assets integrate better in a 'platform of platforms'? @cityverve @loveyourassets @Satsafe #EveryThingIsConnected* (SCMcr)

The "platform of platforms" infrastructure of the CityVerve project embodied the creation of 'a basis for future technologies to exchange data transparently, and the development of applications using that data' (Hemment *et al*, 2018:7). In addition to the '*impact that really the technology and the architecture put together had in the business element of partners*', particular emphasis was placed on the structural role of technology at city level (CV):

> *digital infrastructure is as important as the national highway infrastructure is as important as our public transport infrastructure as the sewage system it runs beneath our streets, the water system that feeds our buildings*

The recognition of this role of digital technologies entailed '*debates on emerging standards and mechanisms*' about IoT in smart cities as well as '*standards and interoperability*' (SCity) in terms of their effective implementation. Concurrently, smart technology was presented as city scale solution to improve services and experiences through the application of skills and capabilities (Section 7.3.1), rather than mere artefacts. Such a role, as complementary to the materiality of technology, consisted of '*transform*[ing] *positively the way we live and interact* (SCity), '*exploring the more social aspects of VR*' (ARVR), '*tackl*[ing] *crucial health and social care issues in our communities*' and showing '*a digital version of the artefacts that are currently held in the MMU Special Collections Gallery exhibition*' (CVerveTW).

7.3.3 Local people and communities

The attention to people and communities' engagement characterised the approach to the value creation and smart city development. Such a people-centred orientation resulted to be more pronounced than simple user involvement suggested by primary findings analysis (Section 6.3.4). Firstly, the findings revealed that people and communities were engaged in different ways. Engaging practices involved the participation of students, visitors, residents and local communities' in cultural projects, events and the use cases designed by CityVerve, such as exploring the city through AR and VR applications. Secondly, an explicit distinction between citizens, users and communities was found to be associated with type of service provisioning, orientation of providers towards services and customer-provider relations. Thirdly, the combined users-citizens orientation developed into a Human-centred Smart City approach and the people-centred orientation higher sub-theme abstraction.

The participation of communities entailed their engagement in local transport planning and city events listing projects and services. In this respect, the PlaceCal project, as community-based geolocated calendar event jointly developed by CityVerve and the Manchester City Council, involved existing neighbourhood partnerships and engaged community workers or volunteers in producing information:

> *We're currently tidying up a few loose ends, and all events should be listing properly again. We've got a wonderful new community worker starting soon so we will start getting back to everyone then, thanks for bearing with us! (PCal)*

In a similar fashion, the co-creation of the "Beelines" transport network infrastructure was expressed through the engagement of the local communities and the support of the cycling community. Complementary to behavioural factors addressing constraints, challenges, and issues (Section 7.5.1) and enabling active participation as well as engagement of the local communities and stakeholders was considered as a bottom-up approach crucial to local transport network planning (BL):

> *Interested local people will be invited to participate in project planning and delivery to ensure that each scheme is owned locally and supported by the delivery team, not the other way around. It is vital that local communities are involved in decisions that affect them.*
>
> *The ten local authorities and TfGM will work closely with communities to keep them engaged in the process. [...] TfGM will develop engagement programmes with schools and businesses to ensure that any infrastructure put in place is maximised locally.*
>
> *It is critical to involve local people, who will by nature have the most detailed knowledge of their streets, at every stage of the network's creation*

The contribution of the cycling community to transport planning, in particular, was linked to citizen engagement, since '*cyclists can feel that they are helping their city and becoming city planners themselves*' (OISSense) through the use of a sensor-enabled and connected bike light in a related CityVerve trial within the Corridor. Such a profound awareness of citizen engagement could be associated to the broad attention placed upon its benefits and participation of residents. While the advantages were presented in terms of '*how cities are transforming and empowering entrepreneurs in their markets through citizen-engagement*' (SCity), active civic engagement respectively emerged from 'co-researching with young children, parents and lecturers' in museums (MM) as well as designing the Bee sculptures for the "Bee in the City" public art event and participating to charity auction for fundraising (Image 1). In stressing the engagement of individual citizens and communities, however, '*a very innovative approach to road testing ideas*' was contended to be '*citizen led, rather than institutionally led*' (CV). Given that '*you got to start from what people want, rather than what you think they need*' to improve service provisioning (CV), the engagement of users consisted of '*doing a lot of stuff with customers*' (CV), keeping '*external comms with the consumers*' as dialogue (CV) and understanding behaviour and perception of services (MaaS).

Image 1. Bee sculpture (STEM Bee), Oxford Road train station

Source: https://www.mmu.ac.uk/science-engineering/about-us/news/story/index.php?id=8481

Even if users, consumers or customers and citizens appeared to be addressed in the same way, their distinction was found in the citizen-focus approach adopted in smart city developments (CV):

> *It's a slightly different take on citizen engagement and it is about starting from points of strength. I'm talking to our citizens about what's good. what they like about things not what's wrong with your place what's wrong with your life. which is often so often what the public sector engagement with individuals is: what's wrong; what's the problem; what can we do to solve it.*

On the other hand, when referring to citizen engagement in association with the smart city marketplace of services, citizens were deemed to act as users or consumers and treated as such. Accordingly, the emphasis on wants and needs driving smart city projects, 'rather than innovation and product' (CV), supported the view of smart citizens as consumers. The active participation of people as users in co-producing services has been strongly placed at the core of smart destinations development (Concilio and Rizzo, 2016; Lara *et al*, 2016), despite critiques concerning citizen-focused approaches in which citizens are often the targeted audiences and their participation 'synonymous with 'choice' and the market' (Cardullo and Kitchin, 2019:814). The findings showed that the people-centred view of

Manchester as smart destination developed from placing people at the centre of services design and delivery. In practice, this people-oriented approach incorporated '*the stories behind the people who make Manchester the place it is*' (CVerveTW) and put the '*visitors and venues at the heart of an engaging and ethical user experience that's positive for all parties*' (CVWiFi). This orientation entailed the challenges and issues of maintaining the balance between '*people at the centre of the smart city*' (SCMcr), the needs and skills of city stakeholders as well as '*value for the city in terms of how that would manifest itself in the city of Manchester*' (CV).

7.4 Value creation constraints

Without any evidence about uncertainties, and little reference to asymmetries, limitations and challenges were found in connection with the main value creation components and smart city projects development. The analysis of findings presented structured and rich evidences of smart city challenges along with the limited data, knowledge, and technology constraints, which were rooted in the challenges of smart technology complexity and data protection regulations. The CityVerve project embodied the major smart urban constraints and issues, including collaboration and contractualisation challenges.

7.4.1 Knowledge, data and technology constraints

The limitations, challenges and issues that affected the value creation components could be presented in terms of their entwined relationship. Considering that data are collected, shared, and analysed in relation to the use of smart technologies, the capabilities and skills required in dealing with such resources are crucial to the creation of value at destination level. In this respect, limited understanding of digital infrastructure management and the lack of data value awareness were recognised as main knowledge-related constraints (CV):

> *I don't think we have begun to understand how digital infrastructure needs to be owned managed and developed and funded in the future either as cities are or nationally.*
>
> *everybody knows you know data is very valuable, but nobody knows how much, nobody knows the different types of data.*

While such poor data knowledge could not be firmly linked to challenges concerning *'data privacy and curation of data'*, in the light of available secondary data collected, the issues

raised by the limited understanding of technology appeared to be related to the complexity of the IoT city network and overcoming commercial regulations and requirements:

> *When it comes to smart city initiatives, it can be a real challenge to bring complex and invisible IoT networks into focus. (CV-FE)*

> *Taking into consideration the requirements about compliance regulations but also in the commercialization requirements that we just talked before about the challenges of moving forward and providing the technology to be able to do it. (CV2)*

The issue of digital connectivity for visitors and communities was also brought up in respect of venues shunning Wi-Fi service offering and access (CVWiFi):

> *For many people, access to Wi-Fi when out-and-about is a necessity, but many people are put off from using public access Wi-Fi services due to their often-overbearing data collection policies and a poor connectivity and user experience.*

From the smart urban perspective, the findings showed that data and technology did not present the same extent of aforementioned limitations or pose similar challenges. Even if not distinctly expressed by CityVerve participants through social media posts, reports or articles, the lack of collaborative competences appeared to be a key issue.

7.4.2 Smart city challenges and issues

At city level, the main challenges concerned the CityVerve project. The lack of governance, cultural differences, policies, and communication issues marked the difficulties in dealing with collaborations and partnerships. Such challenges and issues were embedded in the smart city project, despite the recognition of urban development over time (CV):

> *The role for local government in the 19th century was sewerage and clean water. In the 20th century, it was broadly around transport infrastructure roads airports etc. In the 21st century it's all about the digital infrastructure, as a city on the other side of the world with broadly the same sets of challenges that we've got. If you go to China, they're on a different part of the trajectory, but they're heading in the same direction of having lots of the urban challenges that we've been dealing with*

Given the complexity of Smart Cities development, and the scale of the project, CityVerve participants referred to the different activities raising problems within the consortium. In

particular, they reported issues related to the lack of time to prepare before rolling out the project, the sheer scale of the programme and stakeholders' difficult relationship:

> *that poses kind of immense tensions really, commercial tensions, between innovators and businesses and the consumers of data and the consumers of what they produce for other purposes to create other opportunities*. (CV)

Contractualisation challenges were also presented in terms of '*signing the contract or the collaboration agreement between 20-21 partners*' (CV). When compared with the positive collaborative environment presented previously (Section 6.2.1 and 7.2.1), in fact, CityVerve partners faced cooperative challenges pertaining the large number of actors involved and their diversity. Communication was reported as one of the key difficulties, with differences in '*being receptive to what the project was doing or even understanding what the project was doing*' (CV). Such a kind of asymmetry was expressed in terms of the different size of organisations participating in the project, expectations, and level of awareness about the extent of the projects (CV):

> *It's easy to resource a project at pace and scale, if you're a big company with lots of resources available to much tougher if you're a one-person band.*
>
> *different levels of understanding of what that meant and what the role of the city and the city partners would be in the commercialisation of products*
>
> *And also having the metrics to measure the impact that we're having out there is very unique to CityVerve something that it was very much criticized from our…from InnovateUK and from DCMS from the beginning. It was something that we had to fight almost through the whole two years into something that we needed*.

Effective participation, collaboration, and cooperation among partners of such a large-scale project require collaborative governance capabilities to face communication problems and asymmetries. The lack of governance, instead, was reported as a significant issue that had an impact on the coordination of activities, reviewing processes and delivery (CV):

> *Our biggest problem was that we divided the whole project at the beginning in two parallel tracks in order to accelerate the delivery. And then we ended up not being able to communicate to each other what everybody was doing*
>
> *Our biggest problem was that we divided the whole project at the beginning in two parallel tracks in order to accelerate the delivery. And then we ended up not being able to communicate to each other what everybody was doing*

> *I have to say all the partners left to their own decision and it had to do mainly with them not having other resources or the right time to really devote themselves to the project, that we are here all the partners together after all these.*

All of these challenges and issues did not affect the outcomes of smart city projects and, as recognised by one of the participants, '*the discipline of going through that it's something that we found huge value on*' (CV). To a certain extent, the problems encountered by the CityVerve partners were related to the constraints and issues found across value creation components. Collaborative capabilities, in particular, presented challenges that could be grounded in the lack of governance and management of stakeholders. The technical skills constraints concerning the management of city scale digital infrastructure, the shortage of connectivity and data regulations challenges were not strongly reflected in CityVerve, even if dealing with asymmetries, some form of contractualisation and communication were all reported as issues. As discussed in the next section, such distinctions and difficulties were addressed by adopting a holistic approach and behavioural changes or through financial and commercial factors.

7.5 Addressing constraints

To address the overall constraints, challenges and issues affecting value creation processes in Manchester, finance and behaviour were the relevant factors suggested by the findings. The combination of holistic and business approaches was also identified as a way to face and overcome some of the aforementioned barriers and issues concerning value creation components and the CityVerve project. A holistic approach based on '*looking at the whole [project] rather than the sum of its parts*' and '*breaking the silos*' to create a city 'platform of platforms' could help in addressing the governance issues (CV). At the same time, the perceived outcome of the project was that '*you cannot just break the silos, you need to build new commercial models of how you do this together*' and '*the need to create new business models moving forward to make smart cities of the future real and possible'* (CV). The construction or modification of the business model, therefore, embodied the business approach to neutralise contractualisation challenges and mitigate innovators-businesses-consumers tensions. These solutions and approaches only referred to CityVerve challenges and issues hampering the recognition and creation of value between all actors involved. In

turn, the financial and behavioural factors extended beyond the CityVerve project without excluding it, with elements of trust, flexibility, investments, and funding.

7.5.1 Behavioural factors

The behavioural factors generated from secondary data did not present the same level of details presented by primary findings. Behaviour change, adaptive capabilities, managerial approaches and collaborative solutions characterised this sub-theme. Changing behaviour in the use and planning of local transportation services was induced by a community-based programme led by TfGM, with the aim of providing '*benefits for all users of the street, but some aspects may lead to changes in travel patterns for some people in a community*' (B-lines). The focus on such a change of behaviour addressed digital and physical connectivity issues by engaging local communities to build a sustainable transport network using smart technology. Similarly, collaborative approaches were suggested in terms of '*encouraging people to come to meetings and briefings and workshops'* (CV) to spread CityVerve's positive outcomes beyond the Oxford Road Corridor and to the rest of the city. A public-private collaboration proposal indicated a way of dealing with the challenges of managing and understanding the digital urban infrastructure (CV):

> *And for me a huge lesson in that is not lessened, but a pointer for the future, is that governments and city administrations need to work on this as a problem and actually they need to work on it with industry because industry have got to be the solution to that problem.*

Alongside the active participation and collaborative approaches, '*the ability to be aligned along with the regulations and to be able to provide the data*' (CV) to co-create solutions for the city was mentioned in relation to the lack of knowledge about the real value of data as well as privacy challenges. The capability to '*adjust things in a good and timely way'* as well as the *'real agility to stop doing things when actually you learn that they're not going to work'* (CV1), expressed the flexibility required to address the complexity of smart city projects and their governance. Still, combining such adaptive abilities with '*the rigor and discipline about keeping things on track*' or the 'need [of] a lot of clarity at the front end about objectives and goals' (CV1) was essential to govern the CityVerve consortium. This managerial approach involved formal activities and planning (CV):

What other requirements of running a project like this are, the quarterly reviews, the auditing of every single bit of expense, we're thinking about the run rate of two, two and a half million every quarter and everybody has to put a progress report forward. Everybody has to be evaluated on their deliverables.

Having a comes plan and creating a story about what we're doing together from the beginning instead of waiting at the end.

Addressing smart city complexity and governance by adopting collaborative, adaptive and managerial approaches did not ignore the relevant role of trust, with reference to the need of establishing a close relationship with partners. From the public partner perspective, the trusted relationship with private actors was experienced in terms of their role (CV):

their trusted advisor role that they have has been absolutely priceless for my team in helping us navigate some of this.

Trusting was also expressed in relation to smart ICTs, with regard to the '*trust in invisible agents'*, like AI, and the '*development of an "open IoT mark" to increase trust in IoT devices'* (SCMcr).

7.5.2 Financial factors

The financial factors encompassed investment opportunities and crowdfunding activities supporting smart cities initiative within the Oxford Road Corridor and the city centre. The issue of financial sustainability in the long term is one of the most cited concerns in smart cities projects and smart destinations development (Dameri and Rosenthal-Sabroux, 2014; Boes *et al*, 2016), considering the impact of economic slowdowns on cities and their limited financial resources enforcing prioritisation of smart initiatives against an all-encompassing approach (Anttiroiko *et al*, 2014; Angelidou, 2017). Accordingly, the financial constraints tend to encourage public-private partnerships and active participation of residents and communities in smart city strategic decision making, to cope with the shortage of financial resources. Within the CityVerve project, the financial viability of the smart city initiative was raised by a private partner (CV):

And if anything coming from the private sector being able to come to a city and propose something in a way that makes financial sense to the city it's something that I think we haven't cracked it yet and it's something that we need we need to work.

The fact that CityVerve highlighted the need to focus on financial challenges could be seen consistent with the need of new and sustainable business models at destination level, as mentioned earlier in this chapter. To address financial constraints, in addition, facilitating investment opportunities in the Oxford Road Corridor appeared to be potential solutions. Along with forms of '*incentive for businesses locating in Manchester's #InnovationDistrict*', public-private partnership was reported as a way of improving investments (ORC):

> *We're delighted to be part of the GM consortium working with @briovation to increase investment opportunities for life-science businesses*

With positive impact on local communities, the importance of investments in culture was also underlined (CMcr):

> *"Investment in culture is really interesting because it's also an investment in communities. It's about thinking: 'What's the city that we want to live in?'"*

This view of smart city investments in Manchester appeared to be related to the need of finding financial instruments or increasing existing financial resource to address related urban challenges and issues (Section 7.4.2). Further, funding was presented as a financial solution to respond to smart services constraints and challenges through the collaboration of local organisations, residents, and communities. To implement communities and events services in some of the Corridor areas, for example, co-funding activities were carried out by local actors (PCal):

> *Happy to announce @OneMcr & @afhulmemoss (@MAFNteam) will be co-funding a giant A2 map of all the wonderful stuff happening for Hulme Winter Festival.*

Likewise, participation in crowdfunding activities took place at a charity auction event and through online bidding to acquire the "Bee in the City" sculptures to raise money for the "We Love MCR" charity

> *Good luck to everyone crowdfunding to buy Bees at next week's auction. You can find out more about how to bee a bidder on our website*
>
> *The last lot of the night takes the final auction figure to £1,128,250. What an amazing legacy to leave for @mcr_charity. A huge thank you to all of our bidders!* (B-City)

The use of crowdfunding initiatives in Smart Cities has been recognised as a mechanism to finance community-led projects, enable citizen-oriented innovation, and develop a shared identity of the place within a digital context (Gooch *et al*, 2020). With regard to user-driven innovation, investments and funding of smart projects are crucial to design new services and face related socio-technical challenges and barriers (Komninos *et al*, 2014).

7.6 Innovation

The major theme of innovation was declined through its different forms and applications, which mainly comprised service innovations and social innovations within the Oxford Road Corridor. In such a context, developing new ideas concerned smart technologies, including immersive technology, and the role played by universities in fostering opportunities and commitment to embrace innovation. With attention to the smart Corridor as '*the place where pioneering ideas are brought to life*', the importance of entrenching and spreading innovation beyond the Corridor and across sectors was also recognised (ORC):

> *identifying the need to make innovation 'sticky' through developing systems & capabilities to commercialise university research, and spread innovation across sectors and geographies within GM.*

Experiences and views about innovation within CityVerve provided evidences to generate the open innovation sub-theme. In relation to programs and initiatives carried out within the smart city project, open innovation was associated with its benefits and recognised as valuable and essential:

> *When it comes to innovation it pays to be open minded: our open innovation challenge attracted plenty of attention, and generated some bright new ideas* (CVTW)

> *The open innovation program that we run in there, in the last few months in the project, proves that we created something that can accommodate any new idea.* (CV)

> *By joining the CityVerve Open Innovation Programme, we saw the opportunity to have better access to stakeholders within the city, which will help us refine the value propositions we generate from our data – helping to ensure that insights generated from the data will be used to help the city make more informed decisions about investment in cycling infrastructure, improved road quality and safety and better traffic signage and signalling.* (OISSense)

The orientation toward the smart services and data-driven innovations contributed to the generation of the *service innovation* sub-theme, while the *social innovation* theme seemed to be characterised by wellbeing services and community-based projects. Service and social innovations could be seen as mutually related, even if they are independently discussed in the following sections.

7.6.1 Service innovation

The individual and collective development of new ideas, their commercialisation as well as improvement of city experiences through the use of data characterised the influence of innovation on service production, provision and delivery. In the context of the Oxford Road Corridor, the viewpoints on innovation spanned from the emergent process of embracing '*some of the exciting new ideas that they were not there from the beginning*' or '*didn't envisage at all at the start*' (CV) to '*new ways of thinking about integrating and about creating solutions*' (CV). With reference to innovations co-created within CityVerve, their transformation into services and applications, at city level, was recognised as a key aspect (CV):

> *I think some of the individually brilliant innovations that have been developed that we've touched on before and through the project we're working with those owners now to broaden out their application to continue the demonstration where it's done in demonstration mode and so that they can be brought through into wider commercial use and application.*

The findings showed that data and information played a crucial role in driving innovation, with particular emphasis on local transport services and community events information. The processing of real-time data collected from sensors on bicycles or bus stops fostered innovative solutions to enhance travelling experiences and support city managers in better decision making:

> *This data collection and sensor communication works in two ways. Firstly, it enables the bike light to flash brighter and faster in riskier situations, such as crossing busy junctions or approaching roundabouts. Secondly, it provides valuable environmental data feedback. This could be, for example, data on the quality of the road surface, or highlighting events such as near misses or traffic accidents – flagging up particularly danger-prone sections of city cycling routes.* [...] *helping to ensure that insights generated from the data will be used to help the city make more informed decisions about investment*

> *in cycling infrastructure, improved road quality and safety and better traffic signage and signalling*. (OISSense)
>
> *Say hello to your new, improved, smarter, more helpful, informative, talkative, connected, just all-around better bus stop...* (CVerveTW)
>
> *Participants received daily, personalised travel plans, including buses, trams, carshare, taxi, bike-share, on-demand shared mini-bus and walking – all offered via a single ticketing option. Real-time travel updates were provided along with re-routing during travel disruptions.* (MaaS)

The views on service innovation entailed the redefinition of '*how services are provided in our city*' (CV) by providing '*the solutions that it needs rather than the tech products that it needs'* (CV). Sustainable transport and related innovations, therefore, were presented as solutions to giving people a valuable alternative to the use of cars, along with improving air quality and health (ORC):

> *Cycleway surpasses one-million milestone. Find out the NO2 and CO2 saved, the calories used (in biscuit equivalents!) and the digital display counters on Oxford Road* (Image 2).

Service innovation was clearly associated with the notion of a "cleaner, safer and smarter" city in which user-orientation and community engagement (Section 7.3.3) play a key role. In fact, information provided by people and communities contributed to the co-creation of local events-based services improving social inclusion:

> *The open source PlaceCal platform coordinates and publishes high quality event and organisation information in a variety of formats, creating a really easy to use central source of community data that's updated directly by residents.* (PCal)

Given the evidences provide by available secondary data, innovation in services was linked to improvements in people safety, wellbeing, connectivity, inclusion, and better-informed decisions. In this vein, service innovation was consistent with open innovation, considering the participation in the CityVerve "Open Innovation Programmes" and users' engagement (e.g. cyclists, communities, or travellers). Also, collaborative innovations associated with the integration of value creation resources (i.e. data, technology, and knowledge) seemed particularly relevant from the social innovation perspective.

Image 2. Digital 'totem-pole' cycle counters – Oxford Road

Source: https://aboutmanchester.co.uk/cycle-counters-light-up-oxford-road/

7.6.2 Social innovation

The co-production of innovative services through active participation of users embodies the creation of novel practices derived from the integration of different experiences. This view entails a transition from service innovation to social innovation based on resourcing for value co-creation. As observed in smart tourism ecosystems by Polese *et al* (2018:16-17), 'technological innovation can be considered as service or processes innovation co-created with users and social innovation can be viewed as the generation of new value propositions and the emergence of new informal rules, culture, and rituals leading to the development of the entire local system'. Thus, social innovations should be considered as changes in value propositions and their related influences on contextual factors (Section 7.7). The findings showed a coherent view of collaborative practices and value proposition, as stated by a CityVerve partner:

> *By joining the CityVerve "Open Innovation Programme", we saw the opportunity to have better access to stakeholders within the city, which will help us refine the value propositions we generate from our data* (OISSense)

As for service innovation, the advantages of social innovations were recognised in relation to social well-being, cycling and walking safety, better environmental conditions, improved mobility, and connectivity. Local communities sharing information through advanced ICTs platform, for instance, reduced social exclusion by transforming the relationship between providers and local communities:

> *Overall, we have created an intervention that has transformed the relationships between providers and communities, improving the wellbeing of older people in their neighbourhoods. We look forward to expanding it to the rest of Manchester and beyond!* (PCal)

The crucial role of communities in driving innovation provided also advantages concerning pedestrians and cyclists' safety through their contribution to local infrastructure planning. In regard to the impact of transportation (e.g. better mobility) and the environmental (e.g. lower pollution) on the life of residents and tourists, social innovations incorporate health, well-being, and social inclusion as components of the city identity.

7.7 Contextual factors

Several factors were found to sustain the context in which innovation and value creation processes took place. The contextual factors grouped under the eponymous major theme entails smart city strategy, Manchester attributes as well as beliefs, attitudes, viewpoints, and perceptions sub-themes. The smart city strategy incorporates the collective mission and vision of the Oxford Road Corridor actors alongside the strategic elements presented by the CityVerve partners, comprising governance, communications and creativity. The city attributes encompass those factors exhibited as descriptors of Manchester, such as smart place, events, arts and culture. The beliefs, attitudes, viewpoints, and perceptions factors, instead, encapsulate the personal attitudes and opinions associated with the smart city, openness and data protection.

7.7.1 Beliefs, attitudes, viewpoints and perceptions

The findings showed a range of opinion, perceptions and strong beliefs about Manchester as smart city and value creation components towards which personal attitudes were also presented. As a result of personal attachment to the city, a strong bond with Manchester was expressed by people '*considering themselves proud #CitizensofMCR*' and with regard to loving '*to live and work in #Manchester - "the home of Graphene."*' (CMcr). Whereas the place attachment refers to the affective relationship with the city (Shumaker and Taylor, 1983; Jaššo and Petríková, 2019), the way the place is perceived or understood in relation to own beliefs and attitudes characterises the identity of place (Kavaratzis and Ashworth, 2005). Considering that city identity and place attachment are interrelated (Kislali *et al*, 2020), they can both be influenced by the perceptions, views and beliefs concerning the enablers of value creation processes, their components and the notion of smart city.

With regard to experiences in CityVerve, participants '*reinforced* [their] *belief in the power of relationships*' (CV) and the view that '*Technology permeates every aspect of our lives*' (SCMcr). Expectations, or strong beliefs, were also expressed towards the work undertaken in the smart city project forming '*a blueprint which can be replicated worldwide*' (OISSense). The views of smart cities, in this respect, espoused the idea of cities improving the quality of life for the benefit of people (CVerveTW):

> *cities should be smart as standard; they should just work for people without them having to think about how things happen*
>
> *[...] the pressing need to address global environmental issues. Smart cities, says Bev, can be the foundation for solving some of these challenges #CityVerveMarketplace*

Alongside the view of smart cities as positive and growing phenomenon, focusing on individual innovations was seen in contrast to open innovation (CV):

> *In Cisco we were nowhere in smart cities. Last year I did the 18 keynotes on smart cities, there was no smart city event in Europe today that we don't have a either a keynote or a major speaking slot*
>
> *some folk assumed it would give them a marketplace that their services would be sold into, particularly the public service provider in Manchester City Council. Others saw it as effectively a marketing exercise, but all of them were also focused upon developing their innovations actually.* [...] *We said*

> *from the beginning a smart city in the future is not a city that has a lot of clever ideas, it's a city that can accommodate any idea.*

Such a view was found to be congruent with the positive disposition towards openness and open innovation. In line with the analogous attitude suggested by primary findings (Section 6.7.4), the need of universities '*to open up their IPR rather than hoard or protect it*' (KCities) was presented alongside the '*opening* [of] *the* [smart city project] *platform to all CityVerve partners* [...] *to allow organisations to spread important messages and announcements across whole areas, in addition to individual public spaces*' (CVWiFi).

7.7.2 Manchester attributes

The socio-physical defining Manchester included the Oxford Road Corridor context and attractive factors (i.e. events, arts, and culture), respectively. A higher level of detail was found in the socio-cultural aspects of the city, rather than its socio-physical attributes. As regards to the environment influencing services processes and experiences, *servicescape* was identified as one of the salient attributes of the smart Corridor. The early notion of servicescape concerning the physical environment (Bitner, 1992) has evolved over time to include additional the social and cultural dimensions, in respect of symbolic, relational, and behavioural factors (Rosenbaum and Massiah, 2011; Johnstone, 2012). Considering that findings suggested the adoption of certain forms of behaviours to address constraints (Section 7.5.1), the servicescape sub-theme embodied the Corridor setting (the physical dimension) seen as a smart and collaborative place in which social, cultural and innovative practices took place (socio-cultural dimension). By including the transport infrastructure connecting communities and supporting mobility, with dedicated cycleways and the '*Bus Priority scheme*', the Corridor provided the context for '*Citylabs expansion*', '*MSP's new tech incubator*', '*the new School of Digital Arts*' (ORC) and the pop-up shopping and dining complex of "the Hatch" (Image 3). This cultural, physical and economic environment for residents, tourists and small organisations was also recognised as an expanding innovation district and a smart place, like a CityVerve partner noted:

> *Within the corridor, the project really came at a time when we as Corridor partners were thinking about Corridor as place. We know that we've got brilliant institutions on the Corridor, full of brilliant people doing brilliant things, that doesn't really come across in the Oxford Road Corridor as place, it isn't visible.* (CV)

The identification of the Corridor as smart place supporting innovation, knowledge transfer and services was complemented by the collaboration between local stakeholders. Such an innovative and collaborative environment was described in terms of '*ambition and spirit to create innovative opportunities and collaborations*' (KCities) and in terms of '*development of innovative collaborations, across sectors and scales of organisations*' (SCMcr).

Image 3. The Hatch - Oxford Road

Source: https://www.visitmanchester.com/things-to-see-and-do/hatch-p368811

Events, arts, and cultural practices, at the same time, defined the socio-cultural dimension of such a servicescape. The Corridor provided the environment for festivals, conferences, exhibitions, seminars, and workshops, with universities, art galleries, museums, innovation centres, theatres, and stylish hotels as venues. These public and private spaces enabled diverse forms of social gatherings, spontaneous and not, including '*the march along Oxford Road* [for] *unveiling of* [Emmeline Pankhurst] *statue in St Peter's Square*', '*Manchester Animation Festival @HOME_mcr @mcranimation #MAF2018*', '*Manchester Tourism Conference @CrownePManc @StaybridgeManc*' and art installations '*@cityverve 'every thing every time' by Naho Matsuda at Citylabs'* (ORC). The impact on place making and innovation was recognised, as well (ORC):

> *We're lucky to have so many great cultural venues on the Oxford Road Corridor, from world-class art galleries and museums to cutting-edge theatre*

> *and gig venues. Culture underpins our approach to place-shaping and is fundamental to fostering innovation #CultureMCC*

Within this socio-cultural context organisations designed their value propositions based on collaboration as well as people engagement in the value creation processes (Section 7.2.1 and 9.3.3). Also, the findings showed that "arts and culture" and "events" were recognised as attributes of Manchester. As for the Corridor servicescape characteristics, arts played an important role in defining the city as a multicultural and creative destination. This view was advanced in the '*discussions about language, diversity and the role of culture*' (MM) 'in driving societal change' (KCities) and/or dealing with future technologies (CV-FE):

> *Art can enable us to reach out and touch, or interact with, systems and ideas that are otherwise remote and hard to access. Art can engage the imagination in the future of technology and ask big questions about the potential consequences. And, by engaging the public in concepts and technologies that are not usually easily accessible, art can bridge the gap between engineers (the makers) and citizens (the users).*

This relationship between people, technology and arts has sustained the development of Manchester as smart cultural city. As expressed through a tweet by the City Council, '*we've used art and culture to connect people in Manchester with the technology making their city smarter*' (SCMcr). Engaging with the blurring boundaries between arts and technology was deemed to be crucial '*to contribute to the dialogue between technology, innovation, culture and society*', considering that (CV-FE):

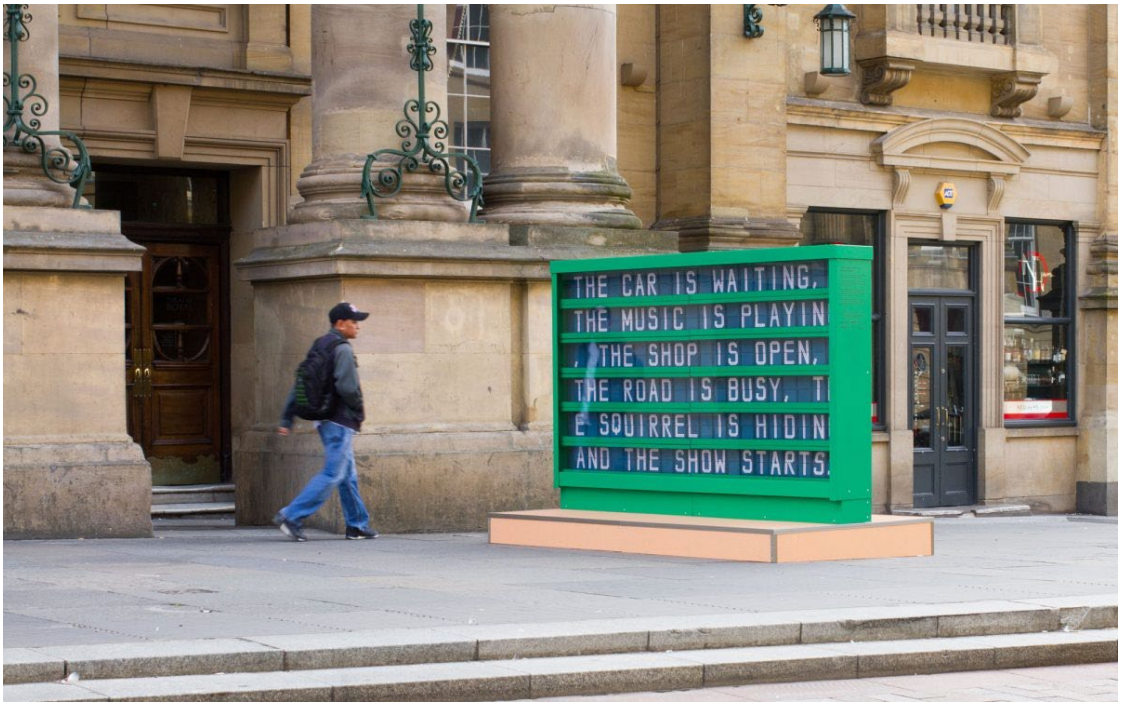
> *Many artists are technologists too. Often working at the forefront of technology innovation, these artists can bring a fresh perspective.*

Further, the use of art to bring people and smart technology closer represented an aspect of the smart creative attribute of the city. As pointed out in a tweet by the City Council (SCMcr), '*We've used art and culture to connect people in Manchester with the technology making their city smarter*'. Public art projects and initiatives played a key role, as well, in defining such an attribute through people engagement. This was the case, for instance, of '*Matsuda's "Every Thing Every Time" in action, a data-driven art installation commissioned for the CityVerve project*' (Image 4) transforming data streams into poetic narratives, '*data-generated sounds played by the Robot Orchestra Collective*' and '*Manchester Plinths* [that]

h*ave taken artefacts from inside the gallery out onto the city streets*' (CVerveTW). The latter, in particular, focused on people engagement with arts and technology:

> *It's all about allowing people to engage with museum artefacts using augmented reality and aims to transform the way we view and engage with collections*. (CV–MP)

Image 4. Naho Matsuda's 'Every Thing Every Time" art installation



Source: FutureEverything

In harmony with innovation and technology, arts and culture could also be considered as a determinant attribute of the city identity:

> *Bee in the City showcased the very best of Manchester, turned the city into a living work of art and celebrated the spirit and personality of its people* (B-City)

As a cultural attribute and element of the city identity, such an approach to public art was found to be also connected to the "events" attribute. In the case of the "Bee in the City" art sculptures, in fact, their distribution across the city created a series of free trail events for visitors, families and general public, who joined the 'B*ee-st Dressed Competition at the Farewell Weekend*' (B-City) event and/or attended the charity event for charity funding. Alongside educational events at museums and galleries, a considerable number of events were connected to smart city initiatives and projects. With regard to data and information, sessions on the 'impact of data on our society #FutureSessions' and 'smart city frameworks

and role of data at #smartcitiesevent @SalfordUni' (SCMcr) were held at universities and cultural venues. Similar events involved '*panel discussion on the relationship between #AR, #VR and storytelling*' (ARVR), sessions on '*the "next generation city of thing" - multiple platforms, multiple domain use cases, shared data*' at CityVerve conference and open call discussions IoT in Synchronicity project (SCMcr). In reference to the Corridor servicescape and smart city events, the city attributes could be correlated to the aspects underpinning the city strategy.

7.7.3 Smart city strategy

The city strategy presented by the findings mainly concerned the Corridor and Smart City projects, with attention to people inclusion and vision. The main component of such a strategy appeared to be liked to communities' engagement, smart ICTs-based solutions, and partnership-based initiatives to improve services and the quality of life. In this respect, the recognition of '*Manchester's position as a vital digital hub on the UK map*' (ARVR) and '*City Council's community strategy*' were presented as part of '*a journey to produce a digital strategy for the city, not just for the city council, but for our public and private partners'* (CV). This was the case of the mobility services strategy (MaaS):

> *The authority concluded there was a strong strategic case for TfGM to invest in MaaS and that MaaS could be a significant tool in achieving TfGM's objectives, along with the wider city goals for sustainability and economic growth set by the Mayor*.

At a different and complementary level, smart city projects and the Corridor servicescape contributed to the city strategy based upon developing '*all that we've learned through CityVerve and apply it in our future digital strategy*' (CV-end) and '*not simply into Internet of Things projects*' (CV), despite '*using new IoT solutions*' (CV-end). As put forward by an article on the CityVerve project (CV-end):

> *Our experience of CityVerve has directly informed the Council's emerging new digital strategy for the city, and the lessons and partnerships developed through CityVerve will play a big part in its development.*
>
> *This is particularly useful, given that digital projects will continue to be a growing part of the council's work in years to come.*

The role of these projects was, thus, recognised as a significant component of the strategic vision of Manchester. Along with CityVerve, the smart city strategy was also informed by the SynchroniCity and Triangulum EU-funded smart city initiatives based on IoT and data technologies. While the Triangulum initiative aimed at developing smart environment and smart mobility solutions based on the collaboration between Manchester, Eindhoven and Stavanger (Triangulum, n.d.), the objective of the SynchroniCity initiative concerned the creation of replicable and scalable IoT and data-enabled smart solutions across eight (8) European cities, including Manchester (Synchronicity, n.d.). Given that CityVerve addressed smart city services across several themes and the Corridor, the smart projects shared a common approach towards citizens' involvement in developing the city strategy through open calls and consultations (Van Bladel, 2019; SCMcr):

> *Reminder: @ManCityCouncil are looking for contributions to our consultation towards achieving our vision for 2025 - if you work for or own a digital business in the city please spend a few minutes to let us know your thoughts*

> *Do you want to help @mancitycouncil understand how we can achieve our goals of becoming a leading city by 2025? If you work for or own a digital business, we want to hear your views as part of a consultation with the sector #smartcities #digital Please RT*

As previously reported for CityVerve (Section 7.3.3), in line with the adoption of co-creation and human-centred approaches (Synchronicity, n.d.), the local communities' engagement was also placed at the centre of smart city initiative (SCity):

> *How does the SynchroniCity #IoT #Data #Marketplace help solving the issue of insecurity? How we created this global marketplace for #smartcities and #communities? @DigiCatapult*

As part of the "Our Manchester" city strategy (Agbali *et al*, 2019), however, the CityVerve experience provided a significant contribution in relation to creativity, governance, urban development, communication and smart living. According to the findings, the development of urban infrastructure was associated to the '*improved integration of cycling into a city's mobility plans*' (OISSense) and '*seamless multimodal public transport where people in a cycling walk and public transport is the first choice*' (CV). CityVerve partners also referred to the role of creativity in developing smart solutions using the art and technology (Section

7.7.2) to '*engage people into the project*' (CV) and eventually to develop a global strategy (CVerveTW):

> *"Now we need to ensure that all the creativity that has been unleashed over the last two years can grow and spread throughout the world"*

In the light of the challenges related to the management of multiple use cases and diverse partners of CityVerve (Section 7.4.2), similar relevance was given to governance in respect of hinging on that experience at city level and beyond the project (CV):

> *From a city perspective, working for the city council, I have to say the governance and the role of the steering committee, which is something that the city council is very keen to build on and retain after the end of the project.*
>
> *And the last point would be what we got out of taking that approach through having the strong governance through making tough decisions.*

When considering communications as an additional strategic aspect to be adopted by other smart city initiatives dealing with governance challenges, CityVerve partners suggested to '*treat external communication as part of an ongoing dialogue rather than talking at*' and all forms of communications as crucial part of the project (CV):

> *And if I give to any or any of those to any other big major project like CityVerve in the future I will tell them that comms is a key part of the project. It has to be there, and it cannot be a hobby on the side. It cannot be an evening job for somebody. It has to be a dedicated resource that really focuses of how do you method the project.*
>
> *You can do the most amazing use case if nobody knows about it. Nobody will ever really adopt it. And this is critical.*

The ability of learning from the CityVerve project and expanding the experiences thereof at city level was associated with the aim of providing smart solution to improve people's living. In this respect, '*CityVerve was designed to be scalable and replicable*' (CV), like the other smart city initiatives. This was consistent with the fact that '*CityVerve supports this far more integrated, connected, and sustainable way of living our lives*' to compete at global scale (CVerveTW):

> *We might not be the biggest city, but in Manchester we know that if you can't compete on scale then it means you need to be smart - and that's what CityVerve is all about*

If you want to have a thriving economy, you have to have a great place to live; and in Manchester that's what we've created over the past few years

The progress of smart city initiatives and their integration into the city strategy appeared to require a co-creative and human-centred approach entailing creativity, smart living and governance based upon effective communications. According to the findings, the Corridor strategic vision should be expanded to embrace '*convergence, connectivity, collaboration - innovation & place*' (ORC). While being part of the city strategy to become smarter, the smart Corridor servicescape provided the living context to develop smart solutions that will eventually implemented at city level and beyond the boundaries of the innovation hub district.

7.8 Chapter conclusions

The complementary analysis of secondary data produced major themes that are broadly in line with the primary data findings. Following an iterative coding process (Section 5.4.3.2), however, a new theme (*Innovation*) and an additional connotation of the existing primary data themes emerged from the exploration of secondary data. The key findings are briefly addressed hereafter.

As a higher level of abstraction, the *Innovation* theme developed from the distinct and yet interrelated service innovation and social innovation practices and solutions. While service innovation entailed new ways of enhancing the production, provisioning, and delivery of services at destination level, social innovation concerned similar improvements for mutual benefits of residents, visitors, and local communities through their active participation. In both forms of innovation, openness and the value creation components (data, information, technology, and knowledge) play a crucial role.

In comparison to primary findings, the value creation component*s* are mainly defined by the knowledge, local people, and communities, rather than data, information and ICTs. This is evident in the emphasis placed upon data skills, participation of residents in smart city projects and the people-centred smart technologies.

With poor indication of uncertainty and asymmetry, *Value Creation Constraints* concerned the issues and challenges imposed by the limitations in smart city projects governance and

the lack of data skills. In *Addressing the Constraints*, a holistic approach embracing financial and behavioural changes about public-private collaborations, partnerships and governance issues emerged as the main factors.

Within the social, physical, and digital environment of the Corridor, the positive view of the city as a collaborative, innovative and culturally active place was reflected in the c*ontextual factors* influencing the value creation process. At the intersection of people, arts and smart technologies, the attributes of Manchester as smart destination are mainly associated with the smart urban strategy and the smart city initiatives carried out in the Corridor.

The key findings of the primary and secondary data analysis are critically discussed in the following chapter, which consider the aggregated conceptualisation of themes and gaps in relation to the theoretical foundations of the study and the tentative propositions.

Chapter 8. Discussing value creation in the Corridor.

8.1 Introduction

This chapter will discuss the main themes generated from the primary and secondary data analysis. All findings will be discussed in relation to the theoretical underpinnings explored in the literature (Chapters 2, 3 and 4) and the tentative propositions presented in Section 4.4. As such, the chapter is structured into four sections. Firstly, the discussion will concern the capability of data and information, collective knowledge, and skills (competences) as well as social interactions enabling or restraining the value co-creation process. Secondly, the collective knowledge-based practices and technology relationship will be addressed to examine how service innovation is produced. Thirdly, asymmetries and uncertainties will be explored in terms of their mutual relationship and implications for value co-creation. Finally, institutions and institutional arrangements are explored to determine the influence and the application of competences and skills. The integration of the extant literature with primary findings will help to ensure an active engagement in the discussion and a critical approach to data. As part of the iterative reasoning process, the theory-driven conceptual map (Appendix 12) and the preliminary frameworks introduced in Section 4.4 will also be discussed, reviewed and enhanced.

In following this iterative and reflexive approach, the key findings will be connected to the existing relevant literature to strengthen them and place the outcome of the analysis within the theoretical and practical context. Further, the goal of the discussion in this chapter is to identify any gap or contrast against the main findings and literature, which may suggest additional lines of research to clarify or expand this study (Section 9.5).

8.2 Data, information, knowledge and collaborative interactions

The findings provided evidences of the role played by data, information, knowledge, and social interactions in enabling or restraining the value creation process. The basic elements of such reasoning were generated by the analysis of key findings and distinguished between the supporting role of collaborative interactions; the enabling and limiting factors of data and information practices; and the role of collaborative capabilities and skills. Each of these aspects will be hereafter discussed in detail.

Proposition A. Value creation processes are enabled or restrained by data and information, collective knowledge-based practices, and social interactions.

8.2.1 The enabling role of collaborative interactions

Value creation processes and practices require the collaboration of all actors involved. The key role of collaborative interactions to co-create value has been widely recognised by S-D logic advocates (Ballantyne and Varey, 2006; Shaw *et al*, 2011; Fitzpatrick *et al*, 2013), on account of the relationship between service systems underpinning service-for-service exchanges (Vargo and Akaka, 2012). Organisations interact one another and/or with users as service systems engaging and interacting in value creation activities. The combination of interactions and collaboration was identified as enabler of value creation throughout the Oxford Road Corridor as much as sharing practices. Data analysis provided evidence of collaborations among local stakeholders at different levels and through different forms of interactions. Within the *value creation enablers* theme, the *collaborative interactions* sub-theme originated from the refinement and abstraction of both primary and secondary data (Appendix 22). Table 31 provides a brief description and the key findings for collaborative interactions.

Table 31. Collaborative interactions (value creation enablers – excerpt)

Theme	Sub-theme	Category	Description	Key findings
Value creation enablers	**Collaborative interactions**	interactions	People & public-private organisations connections & interactions at personal and institutional level.	Diverse form of working and exploring together for mutual benefits (e.g. funding), strategic purposes and innovation. Within and outside smart city initiatives, personal and social interactions as driver of existing and new relationships
		collaborations	Partnerships and other forms of collaboration for common purposes. The Corridor supported collaborations across industries and local stakeholders.	
		Networking	Formal & informal ways of creating or expanding networks of relationships to find opportunities to collaborate	

The findings showed that local stakeholders recognised the significant role of collaborative interactions in the co-production of services and co-creation of value. Despite their distinct

categorisation, generated by the analysis, the entwined relationship between interactions and collaborations was expressed through personal and social interactions within existing collaborations or leading to new relationships. For instance, participants strongly stressed their participation in smart city initiatives, attending events (e.g. workshops, conferences, and seminars) as well as membership in industry association for several reasons connected to value creation and services improvement. This was evident in the activities carried out within CityVerve and the experiences shared by the actors involved. They mentioned the opportunity of working together with citizens and different kinds of organisations on use cases to develop users-centred smart services. Particular emphasis was placed on the fact that customers are partners as much as firms brought together by the smart city project. Also, the partnerships and partnering entailed a view on synergistic relationships between public and private organisations that extended across the Oxford Road Corridor, beyond CityVerve and other similar initiatives, with regard to collaborations in arts and education sectors. This aspect was corroborated by the secondary data findings (Appendix 22), which provided additional evidences about the relationships between academia, arts, museums, industry and users.

The reasons for engaging in collaborations and partnerships ranged from the opportunity to access and share resources to pull solutions together to develop services or for strategic purposes. Exploring ways of co-creating a vision for Manchester as smart destination was mentioned alongside partnering for funding and investments. However, informants drew particular attention to how collaboration was pivotal in accessing data and information as well as knowledge and skills that helped them to face constraints and challenges (Section 6.6.2). The access to the value creation components (data, technology and knowledge) was driven by the willingness of working together and sharing resources, mainly knowledge, data and information. For instance, the integration of external data and technology skills to enhance existing or new services in different sectors (transport, hospitality and culture) was linked to the capability of absorbing and adapting that knowledge into organisational processes. As for the exchange of capabilities and skills, collaborative interactions were recognised as enablers of data and information sharing for mutual benefits, with particular attention to public-private partnerships and the involvement of people. The link between collaboration and interactions was found in the patterns of participation to activities and initiatives not directly related to the smart city projects. The involvement of people and

communities in planning a sustainable local transport network or attending art events for charity funding, for instance, corresponded with the cooperative approach adopted by diverse organisations in testing smart services with users. While interactions were underpinned by the relevance given to the ability to connect different technologies, firms and people (e.g. through the use of art), the positive attitude towards collaboration was fuelled by the engagement in networking activities through organic informal networks and direct/personal relationships. In fact, some of the participants referred to occasional encountering at conferences, seminars or workshops held in the innovation district as one of the potential opportunities of collaboration, along with the nurturing of their business networks. With limited explicit reference to the role of digital interactions, therefore, the convergence of personal and direct relationships with actual and potential collaborative activities was associated with the value of the network as well as the access and sharing of data, information, and knowledge.

8.2.2 The enabling and limiting factors of data and information

Alongside the exchange of stories, experiences and knowledge, the data and information sharing were recognised as a key enablers of value creation in relation to the improvements in service providers decision-making and urban experiences (Table 32). Inter-organisational data and information exchanging involved in the co-production and delivery of city services was deemed as meaningful as sharing such resources with visitors and residents. Whereas public and private organisations can benefit from shared insights on footfall and events by predicting people's behaviour to improve their offering, for instance, users can engage in informed decisions regarding those offers in the light of data and information access and/or sharing. Service co-production and value co-creation, thus, depend on the release of data and information resources for the mutual benefit of all actors collaborating one another, as previously discussed in terms of collaborative interactions (Section 8.2.1). Despite the positive attitude towards the enabling role of sharing practices and the people-centred viewpoint on data, participants highlighted the exchange of web analytics, reports, insights or any other data processing that was passed to users as traffic information, events and similar services. Rather than the data in itself, information was placed at the core of related sharing practices due to the limitations in accessing commercial and/or actionable data. As a result of the primary and secondary data analysis (Appendix 23), the combination of user-centred approaches and smart city projects characterised this specific sharing practices.

Table 32. Data sharing (value creation enablers – excerpt)

Theme	Sub-theme	Category	Description	Key findings
Value creation enablers	**Sharing practices**	Data and Information	Sharing practices involving local stakeholders, with relevance to inter-organisational and firms-users exchanges.	As intrinsic feature of services provisioning, data and information sharing recognised significant to improve services and for firms and users/customers decision making.

Whereas the Living Labs context facilitates the flow of data and information, under certain terms and conditions, privacy protection and commercial interests curb such exchanges. As discussed later in this chapter (Section 8.5), market competitiveness and data privacy laws prevented users and organisations from exchanging sensitive and commercial data and information. This is consistent with the findings provided by interviewees of this study referring to the sharing of data and information in their anonymised and aggregated form. The fact that data and information exist, and they are not shared, was one of the challenges of collecting activities, rather than a barrier or an issue. Considering that the access to such important resources affects the collection as well as the sharing practices, it is clear that analytical capabilities are crucial in dealing with the challenges of missing or unobtainable data and information. Along with the collection and exchange of the large amount of data available and produced by smart technologies (e.g. sensors, AR and mobile applications), analytical skills have been deemed as key to smart destinations development (Gretzel *et al*, 2015; Xiang and Fesenmaier, 2017; Del Vecchio *et al*, 2018). Indeed, the view on data and big data, as drivers of value creation and better experiences in smart destinations, has been based on the collecting, exchange, and processing three-layer framework proposed by Tu and Liu (2014). To identify the users' wants and needs, alongside market trends or potential opportunities, each and all of the related layers should be deemed in terms of transforming the different types of data into compelling value propositions. For example, this was the case of data collected by service providers from travellers using local transport, processed to identify patterns of behaviour, and returned to users in the form of real-time information or better services (e.g. smart ticketing). Being one of the key components of value creation in smart tourism destinations (Section 6.3.1), the data produced by users through smart ICTs require collective skills and capabilities in order to be transformed into information,

insights and eventually service innovations. This is consistent with S-D logic and Service Science notion of value co-creation adopted in the extant smart tourism literature (Wang *et al*, 2013; Polese *et al*, 2018). Big data, in particular, were placed at core of smart destinations (Kitchin, 2014a; Sigala *et al*, 2019) and recognised as a crucial driver for value creation (Del Vecchio *et al*, 2018). In this vein, the translation of the huge amount of data into information and insights has been associated with the use of smart technologies for analytical intents (Morabito, 2015). While addressing this broad view on the role of data, including big data in smart tourism destinations, the findings suggested a slightly different interpretation and an expanded view by giving particular emphasis to people's behaviour and data skills (Table 33).

Table 33. Data, information, and knowledge (value creation components - excerpt)

	Primary data		Secondary data
1s, 2nd Level codes (Aggregated)	• Collection • Analytical (processing) • Data Sharing	• Collection • Analytics & insights	• Integrating different data • Data processing • Collection
Category	**Data and Information skills**	• Collection • Analytics and insights • Big data • Open data	**Data and Information skills**
Sub-theme	Knowledge	Data and Information resources	Knowledge

Category	**Data and Information skills**	• Collection • Analytics and insights	• Big data • Open data
Sub-theme	Knowledge	**Data and Information (resource)**	
Theme	**Value creation components**		

With regard to smart ICTs, the opening of data through APIs was associate to the use of AI and software algorithms to support machine learning practices to parse the large amount of cultural audience or travellers' data for analytical predictions. The mentioning of AI and data warehouses could therefore be ascribed to the instrumental role of smart technology in assisting data management practices, from collection to storage and analysis. Despite the use of such advanced technologies to deal with a lot of data and the positive sentiment expressed in literature about big data, the findings offered a different perspective on their actual benefit in contrast to open data. While recognising the benefits of gaining valuable

insights into users, informants considered big data more for the potential than their actual effectiveness. This position was driven by the current hardware and software limitations in supporting the performance of appropriate analyses of massive datasets, including storage, and dealing with the challenges imposed by data heterogeneity and velocity. In contrast to the growing capacity of data mills, the lack of integration of different systems generated asymmetric access to data and technology resources (Section 8.4) and the scarcity of data skills affected the implementation of appropriate analytical solutions. The criticism found in the literature towards big data (Kitchin, 2014; Baggio, 2016) is reflected in the findings. Interviewees, in fact, underlined the role of "*little data*" in providing meaningful insights, the need for a cultural change towards data management and the positive impact of open data initiatives. This rich understanding came from local data managers interviews, rather than secondary data (Table 32). In the discourse on the contemporary hype concerning big data (Boyd and Crawford, 2012; Madsen, 2018; Lim *et al*, 2018), the issue of restricted access to data 'mainly produced by the private sector' and the value of small data debated in the literature (Kitchin, 2017:36; Faraway and Augustin, 2018) paired with the emphasis placed on open data by participants. The initiatives endorsed by the local city council, in and outside smart city projects, regarding opening data to co-create solutions for people were highly valued and supported by local stakeholders.

Despite such appreciation of open data and a positive attitude towards openness (Section 8.5), criticism was raised upon the lack of compelling business cases, limited access to data that are not genuinely open and a "data culture" that would make sense of useful data to be shared. This was also in line with similar arguments found in literature. The majority of researches, in fact, addressed the empowerment of civic participation in public decision making, governance and social/service innovation through open data (Mellouli *et al*, 2014; Ahlers *et al*, 2019) and the overly optimism surrounding the quality of shared data and their indiscriminate access (Gurstein, 2011; Jamieson *et al*, 2019). Without suggesting to move away from open data initiatives, Kitchin (2013; 2014b), for instance, raised the attention over the lack of financial sustainability, the low utility and usability of non-sensitive data as well as the differences in the level of skills required and access to technology. Many of the barriers and constraints in big data were also found to be related to the open data (Table 34), even if greater advantages were ascribed to the latter than the former. The availability of data in large amounts, whether they are openly shared throughout local government

initiatives or not, did not match the need of actionable data. With regard to accessible resources, data managers stressed the accuracy and quality of data importance to obtain valuable insights and co-create better services experiences. Since open data are often characterised by poor quality in terms of their interoperability, origin, structure and validation, the capability of dealing with this kind of datasets has become essential to select the appropriate sources, avoid the duplication of information, comply with privacy issues and make them usable. With implications to time and costs to collect and curate the data, it is also key to consider that the expected quality and accuracy can vary depending on the needs and wants of users and providers. While a transport organisation in Manchester, for instance, would benefit from real-time location data to improve travellers' experiences, a cultural organisation would need up-to-date socio-economic and/or online booking data to tailor their offer in a more inclusive way.

Table 34. Data and information constraints (value creation constraints - excerpt)

Theme	Sub-themes	Category	Description	Key findings
Value creation constraints	**Knowledge constraints**	Data skills	Limited data literacy. Poor understanding of data processing. Undervalued analytical skills.	Widespread lack of data skills, especially analytical competences.
	Data barriers & limitations (resources)	• Big data barriers • Open data barriers • Analytical problems • Data sharing limitations • Data/Information challenges & issues	Unstructured data management issues. Heterogeneity of data sources and lack of actionable data impact on open data and big data. Data access as major barrier to data sharing.	Access to actionable data and information, overlooking gaps in existing data as major barriers and/or limitations to their collection, sharing and processing
	Asymmetry & Uncertainty	Data and information asymmetry	Different access and availability of meaningful data and information across local stakeholders	Fragmentation and heterogeneity of data sources and their access linked to the asymmetries in ICTs

Big data were similarly discussed in terms of accuracy and quality constraints. Apart from the restrictions in commercial and sensitive data access or sharing, several data managers raised the common problem of overlooking structured data in connection with the lack of technological resources to analyse them once collected. Without any particular distinction between big data and open data, they mentioned the heterogeneity of data sources (data

asymmetry), the hardware and software limitations (e.g. poor CRM), the differential access to technology (technology asymmetry) as well as differences in analytical skills (knowledge asymmetry). While such asymmetries will be later discussed (Section 8.4), it is pertinent to discuss here the concerns about data processing and analytical issues. The collection and transformation of raw data into actionable data requires analytical skills that were reported as missing by data and marketing managers alike. Accordingly, a wide range of skills were deemed to be pivotal to translate small and/or large amount of data and information into insights and eventually value for users. Alongside data processing activities, such as filtering aggregated audience data and integrating online and offline data from different sources to find patterns in travellers' behaviour across the city, participants lamented the massive gap of analytical capabilities and a general lack of analytics awareness across organisations. The shortage of analytical competences was accounted as part of the broader issue concerning the lack of data skills. The findings provided rich insights into the significant role played by data capabilities, and particularly analytical skills, across the primary data analysis, which was later integrated with data collection and processing skills patterns found in secondary data (Table 33).

With implications for the development of a "*data culture*" across the city, it was evident from the findings that poor understanding of data and their value was linked to the limited knowledge of collecting, integrating and processing existing data or facing the lack thereof. Given the claims of a limited number of data managers roles and positions available within public and private organisations in different sectors, it is not surprising that relying on external capabilities was presented as a solution to address data constraints and issues (Table 35). Besides suggesting more data analysts in public and private organisations, data managers relied on different forms of collaborations with the local stakeholders (e.g. universities and IT firms), outsourcing and bespoke consulting to integrate their missing set of data skills needed. Within collaborative interactions practices, the personal relationships and direct interactions with skilled people across organisations (more local than national) were also recognised as highly beneficial to face the lack of data knowledge as well as data challenges and issues. For this reason, engaging with knowledgeable persons in universities and peer companies provided access to external knowledge and data, not to mention the potential opportunity to expand the network of relationships. The individual collaborative interactions, therefore, were presented as a pragmatic solution to data and information

constraints, alongside collaborations at an organisational level. This kind of behaviour is consistent with an entrepreneurial approach to challenges in business and the notion of communities/networks of practice (Wenger *et al*, 2002; Kitchin *et al*, 2017).

Table 35. Addressing data/information constraints (addressing constraints – excerpt)

Theme	Sub-themes	Category	Description	Key findings
Addressing the constraints	Behavioural factors	Behavioural changes	Entrepreneurial and managerial approaches to data/information-related constraints. Change approach to collaboration in data management activities	Different mindset and approaches to face data management (collection, processing, sharing) constraints
	Knowledge	• Data manager role • External data skills • Knowledge for data constraints	Importance of data management roles in organisations to improve analytical literacy and competences. External skills combination with internal data capabilities.	Creation of managerial roles and integration of external data skills (mainly analytical). Pragmatic approach to face data and information constraints through skills and collaboration.

Given the high reliance the networks of relationships, at personal and organisational level, the findings suggested that collaborative capabilities were prominently meaningful within a broader reference to competences (knowledge and skills) as key to innovation and value creation.

8.2.3 The role of knowledge and skills

The strategic role of knowledge was mainly connoted by the application of organisational skills and capabilities to technology and data. As discussed later in this section, this kind of knowledge was complemented by adaptive, absorptive, and collaborative competences at different respective levels. The emphasis placed by S-D logic and Service Science scholars (Maglio and Spohrer, 2008; Vargo and Lusch, 2008; 2017) upon the use of knowledge and skills for the benefit of users was associated by informants to the ICTs and data knowledge-based capabilities applied to create value across organisations, people and communities (Table 36). From a strategic management perspective, at the same time, the application of knowledge to improve services and users' experiences should be considered in terms of innovation and competitive advantage. Data-related knowledge included the capability to collect and analyse the data that smart ICTs produced. Data collection skills were associated

with a rich understanding of the structured and unstructured nature of data, their sources and the ways to treat them. Along the lines of open data and big data discussion (Section 8.2.2), the ability to distinguish between the properties (relevance, accessibility and accuracy), the velocity (real time and historical) and the sensitivity of data was highly valued by informants aiming at gaining insights about users' needs and wants or their behaviour.

Table 36. Knowledge and skills (value creation components – excerpt)

Theme	Sub-themes	Category	Description	Key findings
Value creation components	**Knowledge and skills**	• Absorptive skills • Adaptive skills • External know-how • Data skills • Technology skills • Learning • Collaborative competences	Analytical data and technical know-how relationship. Services creation and/or innovation through external, collaborative, adaptive and absorptive skills.	External knowledge key to gain and integrate missing skills. Emphasis on analytical data skills and the integration of external competences (data and technical) across actors.

Also, collecting large amount of data produced by heterogeneous sources (from bicycle light sensors to Public Wi-Fi hotspots) requires an appropriate knowledge of data models, as for the systematic approach to cultural audience data collection through integrated box office systems. Along with the importance conferred to data literacy skills, however, the prominence given to analytical capabilities over data collection skills was observed in the wide range of activities performed to translate raw data into actionable data and/or insights. By filtering, collating and connecting different kinds of data, organisations could gain meaningful information to sustain informed decisions over services and improve them for mutual benefits, such as alternative route information for travellers to choose from and driving more resources on those routes to improve services thereof.

Knowing how to find patterns in data and information, as for visitors' behaviour across the Corridor and cultural venues, was regarded as determinant in identifying those areas of improvement for services as well as the level of inclusivity and engagement of residents. Along with data integration and visualisation complementary abilities, recognising existing patterns in the large amount of diverse data resources was also key to understand trends and make predictions for the use and the effective implementation of smart services. Data-driven decision making, thus, requires analytical capabilities linked to technology skills. The adoption of machine learning and artificial intelligence solutions to process large amounts

of data and information was particularly reported by data managers, along with the need of specific technical skills concerning the use of APIs, algorithms, and data mapping. Smart technology expertise was also considered as pertinent to the implementation of other tools and services than data processing. According to the findings, participants underlined the development of smart services using immersive (e.g. sensors, AR, VR and IoT) and wireless technologies (e.g. Wi-Fi and 5G). Being capable of integrating different ICTs and knowing how to use them was associated with the engagement of users in their testing to improve or refine services. With respect to the seamless users' experience across multiple devices, in fact, a comprehensive understanding of the digital infrastructure at city level drew more attention than specific technical skills.

Table 37. Knowledge and skills constraints (value creation constraints - excerpt)

Theme	Sub-themes	Category	Description	Key findings
Value creation constraints	**Knowledge and skills constraints**	Data knowledge and skills	General lack of analytical skills (e.g. behavioural data). Poor awareness of data expertise and value of data.	Limited availability and flow of analytical and technology skills across actors, at destination level.
		Technology knowledge and skills	General lack of smart ICTs understanding. Poor knowledge of systemic approaches and siloed skills.	

Within the *value creation components* theme development (Table 38), the technological competences should be considered as interwoven with data skills, rather than distinct. Data and information collection, sharing and processing capabilities require the application of appropriate knowledge to smart technologies producing data and supporting analytics. Hence, the role played by this composite view on knowledge as a crucial factor to address value creation constraints, and the issues generated by the lack thereof, emphasised its importance (Table 37). The limited flow of technical knowledge, presented as siloed skills, affected the application of data knowledge to produce actionable insights. This was evident in the case of cultural organisations striving to integrate the technical skills for analytical purposes and vice versa, as highlighted in the findings by data managers stressing the lack of a technological mindset alongside the cost of hiring data analysts.

Table 38. Analytical progress of value creation components theme

	Primary data				Secondary data		
1st, 2nd, 3rd Level codes (Aggregated)	• Absorb information • Collecting/processing data • Refine & Repurpose services • Market knowledge • Smart travel ICTs skills	• Data and information accuracy • Data collection • Open data vs big data value & potential	• Connectedness • Enhancing user experiences • "Internet of People" • Smart ICTs • Digital tools benefits	• Enhancing experiences • Users-driven service development • Tourists and residents as users • Users expectations	• Converting knowledge • Collective expertise • Smart ICTs skills • Data management • Individual and collective learning	• Immersive ICTs (AI, IoT) • AR/VR, 5G, Sensor, IoT technologies • Standards & Interoperability	• Human-centred Smart City • Engaging visitors and residents • Arts and culture • Residents and tourists' participation
Category	• Adaptive skills • Absorptive skills • External know-how • Data skills • Technology Skills	• Data collection • Analytics and insights • Big data • Open data	• Technology goals • Human-centred technology • Types of technology • Techno-attitudes	• Users orientation • Users engagement • Community engagement • Type of users	• Absorptive skills • Collaborative competences • Technology skills • Data skills • Learning	• Smart ICTs • Smart ICTs solutions	• People-centred orientation • Community engagement • Citizen engagement • Users engagement
Sub-Theme	**Knowledge and skills**	**Data and information (resources)**	**Technology (resources)**	**Users**	**Knowledge And skills**	**Technology (resources and solutions)**	**People and communities**

Category	• Adaptive skills • Absorptive skills • Collaborative competences	• External know-how • Data skills • Technology Skills • Learning	• Data collection • Analytics and insights • Big data • Open data	• Use and applications • People-centred technology • Smart ICTs	• People-centred orientation • Users engagement
Sub-theme	**Knowledge and skills**		**Data and information (resources)**	**Technology (resources and solutions)**	**People and communities (Users)**
Theme	**Value creation components**				

Despite evidence of knowledge sharing practices (Table 39), a major concern arose from the limited diffusion of smart technology expertise at destination level. It was more about the lack of a systemic approach towards smart technology competences than the access to such a specific know-how available across the many tech firms in Manchester. In contrast to the positive attitude towards openness at city level (Section 8.5), this corroborates the need of an open environment and governance to enable the flow of any form of skills and data throughout smart destinations (Meijer and Bolívar, 2015; Ivars-Baidal *et al*, 2019).

Table 39. Knowledge sharing (value creation enablers - excerpt)

Theme	Sub-theme	Category	Description	Key findings
Value creation enablers	**Sharing practices**	**Knowledge and skills**	Knowledge transfer and exchanges for joint development of ideas, services, and innovation.	Knowledge and skills sharing practices from learning and collaborative interactions.

Nevertheless, it was interesting to find that participants identified data knowledge as more relevant than technology skills. This is consistent with the need of analytical competences, as previously discussed, and the identification of data skills as the sole knowledge-based factor to address related constraints (Table 40). Conversely, the findings showed that the technology-related knowledge was not explicitly identified as the solution to data and ICTs constraints, which were primarily addressed through the creativity, discovering, finance, learning, changing behaviour and collaborative approaches (Section 8.3).

Table 40. Addressing knowledge constraints (addressing constraints – excerpt)

Theme	Sub-themes	Category	Description	Key findings
Addressing the constraints	**Knowledge**	• Data manager role • External data knowledge • Knowledge for data challenges	Managerial roles for data, access to external skills and integration of internal data capabilities	Data competences and skills as the crucial and determinant to face value creation constraints through knowledge

The prominence given to data knowledge was seen throughout all the layers characterising smart tourism and smart tourism destinations (Gretzel *et al*, 2015; Xiang and Fesenmaier, 2017; Avelar, 2020), with reference to analytical skills (Table 41). More than data collection and data sharing competences, the ability of processing data and information defined the significance of data knowledge over technical skills. This is evident in the general need of

predicting visitors and residents' behaviour, the huge volume of data available in different formats and diverse sources (i.e. open data and big data) and the transformation of raw data into actionable insights. As complementary and supplementary to the collection and sharing of data, the application of analytical skills was essentially referred to the activities concerning the selection, integration and connection of data and information. This kind of know-how appeared to be remarkably relevant in terms of data-driven decision making and service innovation, because it allows to identify patterns in offline and online people's behaviour within Manchester as well as the expectations of users.

Table 41. Data and technology skills (value creation components - excerpt)

Theme	Sub-themes	Category	Description	Key findings
Value creation components	**Knowledge and skills**	• Data skills • Technology skills	Know-how concerning data (collection, sharing and processing) and ICTs (smart and travel)	Prominence of data (analytical) skills over technology skills and other forms of knowledge

Regardless of being data or technology related, the ability to absorb and adapt external knowledge into smart city projects or organisations value creation processes provides an expanded view of the knowledge component. For instance, to gain market knowledge, in the sense of understanding visitors' movement and engagement with the city, participants relied on external input to develop the necessary know-how. In the matter of smart city projects, external knowledge was absorbed to be turned into user-oriented solutions and services resulting from the combination of different technologies and/or the effective use of data. This was the case of mobile-based solutions tested with end-users (visitors, local communities and residents providing feedback to enhance existing or new services) and the different business scenarios put in place by technical and non-technical organisations combining Wi-Fi, AR, sensors and IoT data for a range of services spanning from sustainable transport to social inclusion and art. The integration of knowledge into the value creation process appeared also to be associated with the ability of adapting both technology and data skills to co-produce new services and refine or repurpose existing services according to users' need and wants. Such adaptive capabilities, in fact, were more related to building and tailoring solutions than making changes to internal processes of firms. Analytical skills concerned understanding the everchanging behaviour and expectations of users whereas technology skills were mainly directed towards repurposing wireless-based applications to

expand services for visitors and residents (e.g. local event Apps) or building new solutions from scratch (e.g. community web-based platform) by combining different existing smart technologies.

The absorbing and adaptive capacity of organisations is discussed here in response to the increasing importance of the external knowledge flows outside firms' boundaries, rather than the internal processes, mechanisms or capabilities to value, assimilate, transform and apply that knowledge (Cohen and Levinthal, 1990). This is also pertinent to the interwoven role played by organisational learning in the generation of knowledge. The findings showed that learning experiences were strongly affected by the socio-technological context of the city, at both managerial and inter-organisational level. Several informants discussed about the transformation of individual learning into actionable knowledge, because of working with other businesses within smart city projects. In such an integrative view of knowledge and learning (Chiva and Alegre, 2005), however, social learning appeared to be crucial in helping to reduce the steep *learning curve* experienced in the CityVerve project. More than internal training on-the-job, practical knowledge was highly valued beyond the ambit of the smart city projects and in relation to social interactions enabled by smart technologies. In line with the dynamic knowledge-based theory of the firm (Grant, 1996; Spender, 1996a; Khadir, 2020), the findings of this study show that knowledge have to be understood in the different forms of practice (knowledge-as-practice) influence and limited by the context in which it occurs alongside learning experiences (Spender, 2008; Easterby-Smith and Lyles, 2011). The learning-by-doing processes have long been correlated with the creation of know-how over time (Arrow, 1962; Anzai and Simon, 1979; Argote, 2012), with increasing technology- mediated experiences and immersive learning being increasingly relevant (e.g. Schaffers *et al*, 2011). Even if participants in this study did not particularly stress learning over knowledge, they recognised that smart technology-mediated environment and social learning can facilitated the transfer of know-how between firms by reducing their internal (embedded) knowledge-based barriers and constraints for external knowledge inputs. The high level of collaboration between organisations, therefore, characterised the role played by the external knowledge flowing across the Corridor (Sections 8.2.1 and 8.3). But, the external knowledge base available to firms should also be considered in the light of the knowledge of users and the adoption of a people-centred approach to services. Tourists, residents, and communities' active participation in testing new or existing digital services,

transport planning and socio-cultural events resulted in an influx of practical knowledge integrated by organisations into the co-production of services and the value co-creation processes. Through the users' involvement and participation in creating and/or developing services, organisations were able to gain the knowledge they lack to respond to the wants and needs of people in Manchester and eventually co-create value with them. In line with the user-centric approach attested by key informants, the role of knowledge produced by users was highly valued by public and private firms and applied to the different stages of smart services development, as findings showed. The city council and museums were able to design, test and improve services by using what is known by local communities and visitors when travelling across the city or engaging in socio-cultural activities. With regard to the use of smart technology, this is consistent with the *know-what* type of knowledge generated by "learning-by-using" (Garud, 1997; Brown and Duguid, 2001), which has been deemed as temporary and hard to gain in a continuous learning environment (Day, 1994; Rosenberg, 2005). Given the pervasive role of smart ICTs and the constant changes of the socio-technical context of smart destinations, the most relevant aspect of the know-how and know-what components of knowledge resides in the providers-users relationships and, to a broader extent, social interactions at destination level. In this respect, the diverse types of knowledge ought to be considered as a collective system of practices aimed at responding to what is lacking (e.g. data or technology skills) to enhance user-centric city services. This is consistent with that stream literature referring to collective knowledge in terms of its active, explorative and practice-oriented application across firms (Cook and Brown, 1999; Brown and Duguid, 2001; Spender, 2007) as much as the integration of this knowledge in value co-creation processes and service innovation (Edvardsson and Tronvoll, 2011; 2013). In agreement with such a constructivist view of knowledge, service and social innovation can be better understood through the discussion of collaborative knowledge in relation to the smart technology environment.

8.3 Collaborative competences, technology and innovation

In contemporary marketing literature, collaboration has been widely recognised as a crucial facet of the value creation process. SD-Logic advocates collaborative relationships as part of the ten foundational premises, with providers and customers always being recognised as collaborators and operant resources (Vargo and Lusch, 2006; 2017). Such a "*marketing*

with" view of the co-production and co-creation of value, however, extend the voluntary exchanges and collaboration to the value network (Lusch *et al*, 2010), with implications for systemic service innovation development influenced by ICTs (Skålén *et al*, 2015; Lusch and Nambisan, 2015). Collaborative activities have been also considered as an inherent aspect of the strategic management processes related to strategic alliances, partnerships, and networks within the ever-changing digital business context (He *et al.*, 2020). Collaboration has become particularly relevant with the emergence of DC and socially based theories of knowledge management (Teece *et al*, 1997; Easterby-Smith and Lyles, 2011) as much as in those streams of literature addressing open innovation and smart technologies (Schaffers *et al*, 2011; West and Bogers, 2014). Thus, SD-Logic and strategic management, along with Service Science scholars (Breidbach and Maglio, 2015), have recognised ICTs as enabler of collaborative practices to support service innovation and develop competitive advantage through the co-creation of value (Evans, 2016). With reference to the second proposition advanced in this study, the relationship between collaborative competences and advanced technologies will be discussed as pivotal driver of service and social innovation.

Proposition B. Service innovation is co-produced through the relationship between collective knowledge-based practices and smart technology enabling value creation, with the aim to differentiate and gain competitive edge.

With regard to the *knowledge* theme within the *value creation component* parent theme (Appendix 24), collaborative competences emerged from the complementary analysis of value creation in Manchester, rather than generated from interviews. Key informants, in fact, stressed the absorptive and adaptive components of knowledge, alongside data and technology skills (Section 8.2.3). Nevertheless, the overall analysis of findings suggests that the inter-organisational capability to work well with one another (i.e. collaborative competences) is strongly linked to the *collaborative interactions* and *sharing practices* enabling value creation in Manchester (Appendix 22). Participants acknowledged diverse forms of collaboration (partnerships) and interactions (online and offline) as the viable opportunities to access and exchange resources for mutual benefits. The collaborative and relational competence of organisations was expressed in their working together and with users to develop or enhance cultural, transport and hospitality services across the city through shared ideas, expertise and other resources like visitors' behavioural data

and information. While users would benefit from enhanced experiences and services at destination level, organisations could improve their value propositions by focusing on effective solutions and lower resources cost by leveraging on collaborative competences.

This is congruent with the SD-logic view of collaborative competences as crucial for the development of absorptive and adaptive meta-competences (Vargo and Lusch, 2008), which in turn help firms to assimilate valuable external resources (data, information and know-how) and transform them to adjust to the changing business context (Shaw *et al*, 2011). Although the Manchester environment facilitates the exchange of resources and collaboration (Section 8.5), the strong willingness to collaborate across the city was found to be rarely translated into effective and long-term collaborations outside CityVerve or other similar projects. This finding corroborates the critical stance towards the excessive reliance on Smart City programmes that are often difficult to be translated in sustainable smart destinations development (Neirotti *et al*, 2014; Yigitcanlar *et al*, 2019) and usually characterised by top-down approaches (Hollands, 2008; Deserti, 2016). Despite the high emphasis on the participation of visitors and local communities, the fact that informants referred mainly to effective collaborations, within the use cases built around technology-driven solutions, seems to reinforce this view. This standpoint on the aggregating role of CityVerve use cases was also associated with strong public-private partnerships required to translate the many and diverse cases into city-wide innovations. The smart services implementation at city level, in fact, has been widely recognised as a significant challenge for the development of smart destinations (Kogan and Lee, 2014), which has prompted a different view on smart ICTs and the relationship between service providers and active users (Concilio and Rizzo, 2016). As reported by all interviewees, the crucial role of this relationship is in line with the emergence of the Human-centred Smart City notion and a growing attention to residents in the smart tourism destination developments. Similarly, a substantial connection between smart ICTs and users was evident in the strong focus on people-centred technology and its use (Table 42).

The nature of the relationship between people and technology cannot be understood without addressing the dual role played by advanced ICTs in service exchanges and value creation processes within the smart service ecosystem. Different types of technologies, from “simple” (e.g. Internet and mobile) to the more sophisticated ones (e.g. AR and VR), were used by organisations mainly to collect and parse data and information as well as

enable connections between all actors across the service ecosystem of the Corridor. The findings show that some of the participants relied on Wi-Fi sensors to analyse visitors and travellers' behaviour when visiting museums or moving across the city. Others referred to the "platform of platforms" as more than the combination of different ICTs enabling the integration of resources and partnerships in and outside CityVerve. Such evidences are congruent with the duality of technology, which can be considered as an operand and operant resource (Akaka and Vargo, 2014; Lusch and Nambisan, 2015).

Table 42. Technology resources and solutions (value creation components - excerpt)

Theme	Sub-themes	Category	Description	Key findings
Value creation components	**Technology resources and solutions**	• Use and applications • People-centred technology • Smart technology	Different smart technologies enabling digital connections, interactions, data, and knowledge sharing. People/users-driven applications.	Smart ICTs as means to improve services and experience of users. People-centre technology (e.g. Internet of people)

As an operand resource, the smart ICTs enabled the access to users' data, near real-time information and external knowledge to create new solutions or improve services. In doing so, technology eased the flow of know-how and the integration of data resources by empowering firms to collaborate with users, who were likewise allowed to participate in service exchanges. Considering the service orientation and value, technology emerged as an operant resource able to act upon the practices and processes underpinning the creation of value and innovations (Orlikowski, 1992; Akaka and Vargo, 2014; Tariq *et al*, 2020). This transformative nature of ICTs was revealed in the form of new combinations of knowledge and insights available to users and supporting an inclusive cultural offering of the city as well as local transport services of the city, with a citizen-focused approach. In other words, practices and processes embedded in *smart* service exchanges and new services were triggered by the technology used. Thus, smart ICTs can be seen as operand resource empowering actors (firms and users) and other technologies to facilitate service exchanges, but they can also activate those processes to support decision making or produce new resources or practices and thereby act as an operant resource (Arthur, 2009; Lusch and Nambisan, 2018). However, It was interesting to observe that many informants referred to ICTs in terms of *means to an end*, with clear indications to their

operand role, rather than pointing to their operant attribute. The operant and active role of ICTs is not given or associated to any kind of technology (Neuhofer, 2016), since it arises from a combination of processes, practices and symbols depending on the contextual factors (Section 8.5) of the service ecosystem (Akaka and Vargo, 2014; Polese *et al*, 2018). Given the high level of knowledge and skills required by advanced ICTs, such as IoT or machine learning, smart ICTs are very likely to be considered as operant resources. Yet, they are still instrumental to the value co-creation processes and strongly affected by the smart service ecosystem context (e.g. socio-cultural factors) in which they operate (Vargo and Akaka, 2012), even if the most recent smart technologies increasingly tend to act without human intervention (Maglio, 2017). Hence, the significance of collaborative interactions enacted by all actors involved in the co-creation of value through the reconfiguration of resource integration patterns, which support the socio-constructivist view of value co-creation and service innovation.

In this technological configuration of the smart service ecosystem, the significant role of collaborative competences should be also considered in relation to the aforementioned shift of focus from a determinist approach to the people-centred view of technology. This relationship between collaborative competences and the evolving approach to ICTs can be understood in terms of its implications for service and social innovations. In line with the Service Science developments (Lusch *et al*, 2008; Barile *et al*, 2017), the interplay between technology, people and organisations can provide an additional perspective to innovations in the smart service ecosystem of Manchester.

8.3.1 Service and social innovation for competitiveness

Innovation was mainly generated from the complementary analysis of value creation in Manchester, with service and social innovation emerging as interrelated new processes and/or outcomes. While service innovation was discussed by key informants in terms of enhancements of existing services or better ways to serve, the analysis of secondary data provided an articulated and systemic view of innovation encompassing social innovation, service innovation and open innovation (Appendix 25). With respect to ICTs as enabler and source of innovation, participants presented service innovation as a process based on the integration of different technology systems and involving organisations and users. Enhancing experiences of visitors and residents was associated with a smart use of data

and technology, particularly through mobility information services. Along the lines of the emphasis placed on data and information resources, data-driven innovation stood out as embodiment of improved experiences occurring in the context of applied smart ICTs and the organisation-user collaborative interactions.

As anticipated earlier, the combination of people, organisations, technology discovered in the findings appeared to be consonant with the view on innovation in Service Science literature. Spohrer *et al* (2007:72) as well as Maglio and Spohrer (2008:18), in fact, note that services systems are 'value co-creation configurations of people, technology, value propositions connecting internal and external service systems and shared information'. Service innovation emerge from a reconfiguration of service systems (or value networks) and the recombination of the resources thereof (Spohrer and Maglio, 2008; Akaka *et al*, 2019). With service systems as one of its pillars (Maglio *et al*, 2009), Service Science view of service innovation draws on the collaborative and interactive configurations of actors and resources creating value (Vargo *et al*, 2010) and expand to a systemic level (Spohrer and Maglio, 2010b). The emphasis has been ascribed to the structural role of all resources involved and their dynamic arrangement to create new value propositions, rather than focusing on specific entities or resources of service systems. Nevertheless, as suggested by Breidbach and Maglio (2015:7), an 'effective service system reconfiguration requires understanding all service system entities, including customers and providers, to identify useful and value-creating configurations.'

Apart from shared data and information, which have already been discussed in this study, the findings show that the pivotal role of people and organisations in creating innovation in the Oxford Road Corridor conforms with both S-D logic and Service Science principles. The active participation of users in the co-creation of value and innovation with firms has been widely recognised in this study. The people-centred innovation view was presented in the form of mobility and cultural service experiences enhanced through the proactive and dynamic combination of data, information, and technology resources by means of collaborative interactions. The collaborative knowledge embedded in social interactions was recognised as essential to the transformation of relationships between providers, individual users, and communities. As a matter of fact, social innovations were embodied in new or redefined value propositions concerning social care, wellbeing of the elderly and transport safety. Such evidences fits well with the people-centred approach in the

recent developments of Service Science and smart destinations (Concilio and Rizzo, 2016; Sangiorgi *et al*, 2019; Coca-Stefaniak, 2020) as much as the fact that innovation occur in service systems that 'are always embedded in social systems, such that social forces shape actors, their value co-creation, and the service systems in action' (Edvardsson and Tronvoll, 2013:23; Vargo *et al*, 2015). In other words, innovations are defined by those collaborative interactions rooted in the socio-economic and socio-technological structure of multiple and dynamic service systems. Thus, innovation in smart destinations can be viewed as a systemic and socially constructed phenomenon. The fact that the smart Corridor was recognised as an environment in which new ideas could emerge and become "*sticky*" reflect the service and social innovation structural nature in terms of the entwined relationship between social interactions and social structures. Yet, this have to be considered in relation to technology and the influential role of institutions on value creation (Vargo and Lusch, 2016), as it will be discussed later in terms of norms, rules, practices, and beliefs (Section 8.5). In considering these issues, the majority of studies have embraced the service ecosystem view (Akaka *et al*, 2012; Vargo and Akaka, 2012) and adopted the structuration approach to make sense of the institutional and social forces guiding and enabling innovation (Breidbach and Maglio, 2015; Edvardsson *et al*, 2018; Akaka *et al*, 2019).

Service and social innovations in Manchester can therefore be better understood by placing the duality of technology, illustrated earlier, into its smart ecosystem. This standpoint allows the identification of collaborative knowledge as the crucial enabler of innovation through smart technology to co-create value and enhance destination competitiveness. There is no doubt that the role of ICTs is shifting from operand to operant resources, since 'they have become smarter, incorporating more human-like capabilities and increasingly acting without human intervention' (Skylar *et al*, 2019:974). Even if smart ICTs can simultaneously empower resource integration actors and facilitate coordination as well as knowledge sharing (Barile and Polese, 2010; Nambisan, 2013), research in this field is still very limited and self-adjusting technologies as operant resource has raised scepticism (Maglio, 2017). Moreover, in line with the evidences presented in this study, the active role of people and organisations has been widely recognised as determinant to the smart service ecosystem conceptualisation (Polese, *et al*, 2018; Femenia-Serra *et al*, 2019; Lim and Maglio, 2019). This is consistent with the structuration model of technology, suggested by Orlikowski (1992), viewing innovation as a result of institutions, technology and human actions key components of service ecosystems (Akaka and Vargo, 2012). By recognising ICTs and innovation as de facto socially constructed

phenomena, the key informants accordingly talked about open innovation and collaboration skills required to manage actors-system-technology interactions (Sections 8.2.2 and 8.2.3). Alongside the specialised knowledge and skills needed for smart ICTs and data management, collaborative knowledge can be essential to improve resource integration and reconfiguration of service systems to develop innovation. Given the complexity of the smart destination ecosystems, it is no surprise that collaboration expertise is key to an effective coordination and integration of innovative resources, practices and processes occurring at different levels of structures and systems (Chandler and Vargo, 2011). Since this knowledge emerges from endogenous collective capabilities and interactions across the value network of smart destinations, it can be recognised as a distinctive and unique source of competitive advantage. Furthermore, collaborative capabilities and skills can help in facing uncertainty and asymmetry issues arising from smart ecosystems.

8.4 The uncertainty and asymmetry influence on value creation

Service ecosystems are characterised by asymmetry and uncertainty. This is essentially due to the increasing fragmentation of market forces, everchanging wants and needs of users and the complexity of interactions at different systemic levels affecting decision-making for value co-creation. While asymmetry could be uniquely referred to disparities in access to resources, the driving forces of uncertainty have been commonly identified in the volatility and variability of value creation components. The critical role and the constant evolution of ICTs has intensified these aspects of service ecosystems, with an impact on the economic and socio-technological environment thereof. Continuous adaptation to different market conditions and novel forms of interactions as well as fragmented access to technology, data and information are some of the related factors elicited by ICTs. This holds particularly true for smart tourism destinations, given the dynamic and complex nature of their smart DBEs.

Proposition C. Asymmetry and uncertainty in a smart destination ecosystem are mutually related, with implications for the process of value creation and service innovation. Their impact can be reduced or mitigated by the adoption of a socially based view of knowledge management for value creation.

To understand their impact on value creation and service innovation processes, asymmetry and uncertainty were interpreted as constraints and limiting factors. When compared with asymmetry, the findings did not provide extensive evidences of uncertainty throughout the

analytical development of the theme (Appendix 26). The main concerns pertained public and private organisations competing objectives for data management, constantly changing users' needs influenced by ICTs and local political instability. Whereas the indecisions over the use of data and their effective management can be linked to the emphasis given to data and information constraints by informants (Section 6.5.3), the uncertainties that emerged from changes in local government policies and market demand dynamics appeared to be connected to contextual factors (Sections 6.7 and 7.7). Such a limited acknowledgement of uncertainty in this study reflect, to a certain extent, the modest level of in-depth research on this specific issue in smart destinations and smart service ecosystems. Still, the literature in this specific fields of research has mainly addressed the intrinsic unpredictable nature of smart destinations (Batty *et al*, 2012; Gretzel *et al*, 2015a; Karl, 2018), characterised by the complexity of tourism cities ecosystem (Newman and Jennings, 2012; Sainaghi and Baggio, 2017). To face this, there is a growing body of research focusing on the search of different solutions based on value co-creation and innovation (Barile and Polese, 2010; Buonincontri and Micera, 2016), with implications for the market, people and organisations. In this study, similar solutions emerged to address overall barriers and constraints, including uncertainty, with regard to social innovation, creative activities, openness, and effective collaboration among local stakeholders (Sections 6.6 and 7.5). Yet, the findings did not capture the extent of the uncertainty issues, since distinctive and consistent patterns were not generated from the progress of analysis (Appendix 26), which suggests the potential areas to be explored further.

By contrast, the findings provided a detailed view of asymmetries occurring in Manchester. Differences and gaps in the distribution and access of resources were presented across all main components of value creation, along with structural asymmetries concerning market and social dynamics at destination level. Given the systemic relationship between data and advanced ICTs in smart destinations (Xiang *et al*, 2015; Del Vecchio *et al*, 2018), the related gaps, imbalances and divergences have been widely addressed in smart tourism and service marketing studies (Wang *et al*, 2013; Anttiroiko, 2014; Gretzel *et al*, 2015b). Some of the specific traits assessed in the literature were also discussed by informants and generated from the findings. Data and information were not available in the same format or structure and their access was not possible, as expected, to all local stakeholders, with implications for effective data resources management. These asymmetries are actually compatible with

the concerns found in this study over the lack of data and information (Section 6.5.3), their accessibility when available and the emphasis on open data (Section 6.3.1), which are very much in line with the most recent academic works addressing the same issues. For instance, the problem of fragmented access to data and information has been identified in several destinations in relation to their smart developments (Buhalis and Foerste, 2020; Kitchin and Moore-Cherry, 2020). Open data strategies have been discussed as an opportunity for cities to address this kind of asymmetries, among other structural ones (Celdran-Bernabeu *et al*, 2018; Ghahremanlou *et al*, 2019). The earlier notion of information asymmetry across value network has been integrated in the evaluation of smart destinations development pros and cons (Lusch *et al*, 2010, Wang *et al*, 2013), as the discourse of S-D logic evolved towards the service ecosystem concept (Vargo and Lusch, 2017). In fact, the smartness of destinations service ecosystems has been often associated with the so-called *infostructure* and the positive view of data and information availability to all stakeholders through ICTs (Komninos *et al*, 2014; Gretzel *et al*, 2015a; Jovicic, 2019). Concurrently, a more realistic approach to data-driven smart destinations has been increasingly adopted to consider the structural inequalities (Edelenbos *et al*, 2018; Kitchin, 2019; Yigitcanlar *et al*, 2019). Hence, the data and information asymmetries of smart destination ecosystems cannot be isolated from the interrelated asymmetries of knowledge and technology.

The so-called digital divide merely exemplifies the problem and challenge of affording and accessing advanced ICTs to collect and analyse data or provide and use services. Such issues have been acknowledged by the researchers focusing on smart destination developments (Minghetti and Buhalis, 2010; Gretzel *et al*, 2015c), with attention to knowledge and skills gaps and their impact on value co-creation (Buonincontri *et al*, 2017; Femenia-Serra *et al*, 2019). SMEs that cannot afford the access to advanced digital infrastructure, despite their availability, and smart services access precluded to people without smartphones could be associated with the *different testing abilities* across the organisations in Manchester, the *fragmented core technology platforms* requiring specialised data and technology skills that are perceived as *dispersed* and *undervalued*. The impact of the knowledge and technology asymmetries on value creation processes can be identified in terms of hindering or limiting resources integration. So, these asymmetrical features need to be reduced or neutralised to facilitate resourcing throughout the smart service ecosystem. In the light of the emphasis on smart technologies and the strong dependency of people (residents and tourists) and

organisations on digital ICTs, it is interesting to note that tourist destinations asymmetries are usually associated with the notion of digital divide. From a smart service ecosystem perspective, the different types of asymmetries should be recognised and addressed in relation to the urban socio-economic structures. Considering the asymmetrical relationship between all actors involved in value creation (Edvardsson *et al*, 2011; 2012), the structural approach to asymmetries appears to be more appropriate to understand their impact and how to address them. The asymmetric power relationship existing between the actors of a smart service ecosystem (Peñaloza and Venkatesh, 2006; Kitchin, 2019), for example, was expressed in this study as a gap in the ability to integrate digital resources between public and private organisations and the divergent strategic vision of the local public transport organisations. Smart destinations tend to reflect and amplify extant disparities in local resources availability and accessibility by people and organisations. Specifically, the TfGM and local buses organisations strategic vision differences reflect the deregulation of local transport services (Section 8.5), while the public/private different affordability of resources could be referred to the respective conflicting roles and capabilities to access data, information, ICTs and knowledge (Sections 6.5 and 7.4). In this respect, the smart city projects acted as a catalyst for the mitigation or neutralisation of such asymmetries through public-private partnerships and collaborations. Similarly, the active participation of all local stakeholders involved was regarded as crucial in solving resource conflicts and reducing role ambiguity, within and outside the smart city projects.

Indeed, collaborative behaviours and the active participation of users in the co-production of services were valued as important to address structural asymmetries, uncertainty and other value creation constraints (Appendix 28). This was evident in the role ascribed to users, their engagement, and the collaboration of all actors. Being inclined to work together to enhance existing services, or develop new ones, required re-distribution and integration of specialised knowledge and skills, alongside entrepreneurial and creative behaviours to face the uncertainty linked to the lack of any value creation component. With smart service ecosystems complexity incorporating both asymmetry and uncertainty, the approaches to address them cannot be completely distinguished in their application to one or the other constraint. Entrepreneurs highly rely on creativity to engage with and shape innovation processes as response to uncertainties and asymmetries of smart tourism destinations. While acknowledging the little analysis available on this matter for smart cities and smart

destinations, in fact, Williams *et al* (2020:5) identify uncertainty as a driver and a challenge to innovation processes and entrepreneurs as an 'important source of new knowledge and creativity'. They have also cautioned over the structural asymmetries that can emerge in the strong and weak regional innovation systems differences in accessing infrastructure, financial and knowledge-based resources for smart destinations development. Similarly, concerns were expressed in this study towards the different level of smartness between Manchester and the rest of the region (the so-called "London effect").

Creativity is therefore an integral part of the entrepreneurial mindset and together they require an open innovation environment in order to develop responses to uncertainty and asymmetry. The importance of open innovation settings in smart destinations has not only associated with the entrepreneurial creativity (Audretsch and Belitski, 2013; Ferraris *et al*, 2020), but also with the flow of ideas and resources (knowledge and data) that are easily shared resources and notably collaboration (Schaffers *et al*, 2011; Xiang and Fesenmaier, 2017; Gretzel, 2018). In their different forms, either smart project-based cooperation or long-term partnerships, collaboration activities and related interactions were mentioned over innovation and value creation matters, within this study and in literature. Anttiroiko *et al* (2014:327) refer to the collaboration between city authorities and local communities as potential "*smart partnership*" being able to 'add greater value by 'designing into' the social contract between state and citizen the creativity that can change the behaviour of service providers and service users and thereby improve outcome effectiveness'. The active participation of people in smart initiatives (Castelnovo, 2016), collaborative governance (Barile and Polese, 2010), public-private partnership and cocreation activities (Buonincontri *et al*, 2017; Gretzel and Scarpino-Johns, 2018) are some of the key responses suggested by S-D logic and smart tourism scholars. Clearly, the collaboration between local stakeholders involves ideas and resource sharing, with a consequent transfer of knowledge and skills that would eventually help to face the lack or unequal distribution of resources. Based on this perspective and all of the aspect discussed here, it is not difficult to recognise that such entwined structural constraints to the co-creation of value cannot be understood without adopting the social constructivist approach to smart tourism destination and value creation (Hunter *et al*, 2015; Polese *et al*, 2018). In fact, the influence of uncertainty and asymmetry on value creation, as well as the responses to them, highly depend on the rules, norms,

beliefs, and practices of the smart destination ecosystem (institutions) in which they are embedded (the Corridor).

8.5 The holistic view of value creation in smart destinations

As an essential component of the S-D logic and Service Science narrative, the institutional logic helps to understand the influence of contextual factors on value creation processes within a smart destination ecosystem (Akaka *et al*, 2019). The shared beliefs, practices, laws, and rules, known as institutions (Vargo and Lusch, 2016), are hereafter discussed as contextual factors influencing service exchanges, resourcing and value creation. In this respect, they are the building elements of smart service ecosystems formation and re-formation, as the context for creating and furthering service innovation and value. This systemic and networked perspective implies that institutions in smart destinations are endogenously generated and shared by multiple actors, with a particular reference to people assembling institutions (i.e. institutional arrangements) to support or coordinate their understanding and actions. Institutions shape interactions practices and meanings, while institutional arrangements facilitate the coordination of shared institutions, service innovation and value creation activities (Vargo and Lusch, 2016). Still, the restraining and limiting influence of institutions should be also considered alongside their positive and beneficial role (Akaka *et al*, 2018).

Proposition D. Different types of Institutions (e.g. shared norms, rules, symbols, beliefs, and meanings) and institutional arrangements affect the application of socially based knowledge practices in value creation processes.

The development of the *contextual factors* theme (Table 43) offered a holistic view of the smart Corridor ecosystem. This integrated and overarching perspective resulted in the generation of the following crucial institutional elements: beliefs; formal and informal practices, rules, laws, and norms; attitudes, views and opinions; city attributes; smart city strategy.

Beliefs

Among the set of *beliefs*, the opinions expressed on Manchester stood out against those on collaboration, data, and information. Some of the peculiarities of the city, the fact that it was deemed as a cultural and creative place combined with the notion of the physical-

digital ecosystem nurtured the strong belief in the smartness of Manchester. Without mentioning any specific evidence, interviewees had no doubt about the culturally driven spirit of the city, its industrial heritage, the pragmatism, openness and sense of belonging as distinctive features. All of these elements can be interpreted as some of the key pillars of the urban leisure offering that characterise the destinations attractiveness, which is empowered by a digital business ecosystem based on networked combinations of actors, resources and the inclusiveness of residents in the design of new services. Even if these elements generated confidence in the smart destination developments, the smartness of Manchester was not believed to be a process uniquely built on the integration of digital technologies. This is sustained by the thoughts and opinions expressed over two of the key aspects of smartness and value creation addressed in this study: collaboration and data/information. Trusting each other and being accustomed to work together in any form of collaboration were deemed as innate features of the collaborative "*vibe*" of the city.

Still, the problem of translating collaborative intentions into actual collaborations, or the emphasis on willingness against intents, was also accepted as part of the current societal behaviours and doubts over the data-driven solutions affected by the lack of data and information resources. On the one hand, the confidence placed in some of the distinctive characteristics of the city as smart destination reinforces the idea of a context facilitating resourcing and exchanges. On the other hand, informants had the strong impression that the journey towards smartness is will be long and it is still at its beginning, with some of the value creation components and enablers being affected. Since value is collaboratively co-created and data are a key resource (Buhalis and Foerste, 2015), any issue or lack of data and/or actual collaborations would destroy value in smart destinations (Neuhofer, 2016). Value could be co-destructed when actors involved in collaborative interactions for value formation lack crucial resources like data and information (Lintula *et al*, 2017; Buhalis *et al*, 2020). By placing the concept of value *no-creation* in between the co-creation and co-destruction continuum, Makkonen and Olkkonen (2017) observed that poor or missing collaborations and interactions between firms could result in decreased (co-destruction) or unrealised (*no-creation*) *value in context*. Thus, the beliefs expressed by informants embody the positive potential and the risks embedded in the Corridor smart service ecosystem settings and dynamics.

Table 43. Analytical progress of contextual factors theme

	Primary data				Secondary data		
1st, 2nd, 3rd Level codes (Aggregated)	• Collaboration "vibe" • Trust each other • Lacking data • Data-driven solutions • Smart destination • Culture/Creative city • Peculiar attributes • Ecosystem	• Written down rules • Formal agreements • Rules for funding • Structured service delivery • Data and information practices, laws, and rules • Data protection laws and rules • Deregulation • Terms & Conditions	• Catching up with first movers • Tacit collaboration • Organic/Personal connections • Data/Information norms	• Open data • Technology-enabled • Open innovation • Openness • City Council policies • CityVerve • EU projects • Positive/Negative views • Smart city strategy • Smart city project continuity	• IP open to business • Opening platforms • Partnership power • Expectations • Bringing everything together (marketplace) • GDPR	• Smart Art and Culture • Arts and Culture • Smart city events • Oxford Road Corridor (Arts, Culture, Events) • Collaborative environment • Smart place	• CityVerve • Innovative Place
Category	• Collaboration viewpoints • Data/Information views • Opinions on Manchester	• Formal collaborations • Public funding • Structural approaches • Data/Information • Competition • Contractualisation	• Habits • Collaboration and partnerships • Norms	• Openness • Urban agenda • Smart city projects	• Openness • Beliefs • Smart city views • Data protection	• Arts and Culture • Events • Servicescape	• Oxford Road Corridor • Smart city projects
Sub-Theme	**Beliefs**	**Formal practices, rules and laws**	**Informal practices, rules and norms**	**Attitudes, viewpoints and perceptions**	**Beliefs, attitudes, viewpoints and perceptions**	**Manchester attributes**	**Smart city strategy**

Category	• Collaboration • Data/Information • Opinions on Manchester	• Formal collaborations • Data/Information laws & rules • Competition • Contractualisation	• Habits • Collaboration & Partnerships • Norms	• Openness • Smart city views	• Arts, Culture & Heritage • Servicescape	• Digital Business strategy • Smart city projects • Smart city events
Sub-theme	**Beliefs**	**Formal practices, rules and laws**	**Informal practices, rules and norms**	**Attitudes, viewpoints and perceptions**	**Manchester attributes**	**Smart city strategy**
Theme	**Contextual factors**					

Formal institutions

Inter-organisational collaborations were explicitly presented in the form of written down agreements whereby public funding could be easier obtained and structured approaches to service exchanges and resourcing. By setting out clear and effective ways of working together, formal rules and laws guided the collaboration between actors participating in smart city projects (e.g. CityVerve) and regulated providers-users interactions. Whether in terms of service exchanges or resource integration, the application of such *formal institutions* was exemplified by contractual relationships based on terms and conditions agreements. Smart service ecosystems are strongly characterised by explicit regulations and laws governing the coordination of local stakeholders (Barile and Polese, 2010), with impact on value creation components, processes, and practices (Vargo and Lusch, 2016; Polese *et al*, 2018). The normalisation of service exchanges and collaborative interactions helps to improve the efficiency of the smart service ecosystem by reducing ambiguities through formal contracts, rules, and laws. As contended by Pellicano *et al* (2018:46), 'in the urban context it is necessary to regularize the exchange between the actors through guidelines and rules defined appropriately'. This was mainly manifested in those explicit rules and regulations concerning the exchange and integration of data resources, rather than other components of value co-creation in smart ecosystems.

Given their crucial role in smart destinations development, data management regulation and laws have been the main concern of scholars and practitioners. According to Kitchin (2014a:9), the collection and analysis of data is significantly affected by 'the regulatory environment with respect to privacy, data protection and security' to avoid any harm that 'might arise from the sharing, analysis and misuse of urban big data' (Kitchin, 2019:226). Firms in Manchester showed the same consideration over regulations, with attention to the laws and formal rules pertaining public and private sensitive data and/or information sharing. Interviewees acknowledged the importance of protecting collected personal information by way of anonymised data. In doing so, they appreciated the intrinsic risks of data practices enabled by smart ICTs. Ng and Wakenshaw (2018:207) refer to the negative externalities associated with privacy costs and firms running 'the risk of being penalised by the market for being perceived as invasive of consumers privacy by collecting consumer data but not adequately protecting it'. With direct and indirect reference to GDPR rules as mandatory requirements, users' data protection was highly

regarded as a priority among all participants. As pointed out by Xiang and Fesenmaier (2017:305), in fact, 'privacy is an obvious concern in the context of smart tourism, especially location-based services, while extremely useful for tourists, also make consumers vulnerable'. Still, the limitations imposed by data protection laws and rule have an impact on sharing of data and information as well as the availability of actionable data, as showed by primary data findings. Similarly, market rules affected data practices and collaboration across the smart service ecosystem.

Competitive laws were also identified as another factor preventing data and information sharing as much as limiting collaborations, alongside an excessive stress on competitive behaviours. While showing the impact on the sharing and integration of value creation components (mainly knowledge and data constraints) and city governance, the findings enriched that strand of smart tourism literature focusing on the collaborative value co-creation triggered by competition and fostered by advanced ICTs. This appeared to be in contrast with the optimistic views of competition and collaboration in smart destinations. Kitchin *et al* (2017:4) refer to the 'smart city rhetoric and initiatives promot[ing] intensive collaborations between public sector bodies and other stakeholders', particularly private organisations. Contrary to the emphasis placed on public-private-consumers collaboration in smart tourism destinations as much as the marketisation, privatisations and deregulation of city administration work (Gretzel *et al*, 2015a; Kitchin and Moore-Cherry, 2020), evidences showed that the local transport privatisation and deregulation hindered collaborative and resource sharing behaviour across local bus companies. Yet, this should be considered in terms of the limited impact on the collaborative environment and relationships between all different actors, without overlooking 'the tensions between collaboration and competition amongst different public and private interests' and competing objective (Taylor Buck and While, 2017:502).

Informal institutions

Informal collaborations characterised value creation practices, particularly the integration of resources, and the way of facing constraints. The occasional and indirect interactions across participants allowed access to data, information, and skills otherwise unavailable by means of formal relationships. Personal connections with scholars and skilled people in private and public organisations were highly valued in the development of new ideas and co-production of services. This aligns with those entrepreneurial approaches seeking forms of collaboration

alternative to formalised or contractualised agreements in order to make strategic decisions over resourcing and service innovation. Considering the complex and networked relationship between actors (Del Chiappa and Baggio, 2015), it could be argued that smart destinations compete and innovate through collaborative entrepreneurship (Miles *et al*, 2006; Ferraris *et al*, 2020). Despite criticism over smart destinations entrepreneurial and collaborative aspects (Hollands, 2008; Tribe and Mkono, 2017), there is agreement on the fact that a smart tourism services ecosystem 'is built on trust, scalability, and openness with respect to participants and services' (Batty *et al*, 2012; Gretzel *et al*, 2015b:559; Polese *et al*, 2018). Collaborative capabilities evidenced in Manchester can be associated with the attitude towards openness discussed later in this section, alongside the digital-physical servicescape of the Oxford Road Corridor opening different forms of collaboration. Furthermore, as much as the level of trust among existing connections or service encounters, tacit collaboration contributed to organic collaborative networks creation across sectors and outside smart city projects platforms. The critical role played by trust, openness and personal interactions ensured the emergence of networks of practice that were not explicitly discussed by participants or found in secondary data analysis. The entrepreneurial and collaborative orientation of the city, in fact, showed that smart destinations actively 'seek out arrangements that allow for flexible relationships' besides firmly established networks (Gretzel and Scarpino-Johns, 2018:271), with knowledge and data sharing favourably affecting resilience and governance (Beritelli, 2011).

Attitudes concerning openness and smart city could be considered as distinct and at the same time interwoven propensity to open innovation and the development of a people-centred smart destination. The contribution of an open environment to smart destinations progress has been commonly analysed and discussed through narratives focusing on diverse forms of collaboration and innovation enabled by lower inter-firms' barriers (Egger *et al*, 2016; Jovicic, 2019). An easier exchange of external resources and knowledge sharing embedded within the socio-economic system of smart destination facilitate their integration into service and social innovation practices for the co-creation of value (Buonincontri *et al*, 2017; Polese *et al*, 2018). The strong predisposition towards openness in Manchester was evident in the open-minded and positive approach to open data, rather than big data, and open innovation, as a way of enabling the flow of ideas to do things differently. Yet, openness presents limitations grounded in social inequalities and different capabilities in accessing or using advanced ICTs, data, information and knowledge shared across open innovation hubs, such as Living Labs (Kitchin, 2013; Ferraris *et al*, 2020), with implications for social, economic and technological

asymmetries evidenced earlier (Sections 6.5.4 and 8.4) and in literature (Anttiroiko, 2014; Neuhofer, 2016). The findings showed that the actual implementation of an open ecosystem is still at its early stage of development, nearly as much as Manchester's smartness. Through a mix of positive and negative views, the responses were along the lines of the increasing attention to smart cities and their implications. Whereas the limited integration of "not-so-smart" technologies, data and information were perceived as hindrance to make a city smart, the association of smartness with digital innovations was viewed as beneficial to the creation of an integrative platform for services and wellbeing. Contrary to such emphasis on ICTs, the involvement of users in the co-production of services and user-oriented approaches to value creation practices evidenced the influence of a people-oriented attitude towards smartness on collaborative and resourcing behaviours. Yet, such an attitude was not strongly underlined to suggest an agreement with the so-called human-centred smart city concept (Concilio and Rizzo, 2016), stressing a more balanced and less technology-based definition of smartness (Lara *et al*, 2016).

Manchester attributes

The prominent attributes denoting Manchester as a smart tourism destination were linked to the *Servicescape and Arts, Culture and Heritage*. These peculiar attributes were generated from the complementary analysis of value creation (Section 7.7.2) and showed the relevance of those respective tangible and intangible construct of the city. The meaning given to the arts and cultural initiatives mainly concerned the connection between people, technology, and public spaces, with events being the socio-technological environment for connections between tourists, visitors, and organisations for value creation practices. Events associated with the "Bee in the City" art city trail and the "Manchester Plinth" art project, for example, allowed collaborations between cultural organisations, smart technology actors, universities and the local council to facilitate local residents, communities and tourists' engagement with the art and heritage of the city. So, the sense of belonging to Manchester was strengthen through those cultural service propositions that were encompassing visitors value creation practices, based on the use of smart technologies as an operand resource. As contended by Sacco *et al* (2012), recent technological advancements have largely influenced the evolution of culture towards a collective and participative phenomenon entailing diverse forms of entrepreneurship, social learning, interactions, and socio-economic value creation. Indeed, the diffusion of smart ICTs and their integration into cultural practices at destinations has transformed cultural tourism along two lines: a stronger interplay between culture and

tourism identified in different forms of consumption (Richards, 2018) and the participation in creative tourism experiences identified in the creative economy and tourism growing convergence (Gretzel and Jamal, 2009; Richards, 2014). In this respect, the findings were consistent with an instrumental view of technology. The application of AR/VR to museums and the use of AI in data-driven art installations was considered as a means to connect people to tangible and intangible cultural attractions, with implications for educational purposes, social bonding and community's cohesiveness. In fact, smart ICTs are increasingly blurring the tangible and intangible boundaries of cultural and creative tourism practices entailing leisure, active participation, co-production, and consumption (Ruggles and Silverman, 2009; Pappalepore *et al*, 2014).

Since the cultural context frames and mediates value co-creation through key intangible resources (i.e. knowledge) and institutions of a smart service ecosystem (Akaka *et al*, 2013), it is appropriate to consider such a contextual view of value in respect of the influence of a smart servicescape encompassing both tangible and intangible resources and practices (Roy *et al*, 2019). Although its initial definition of the term referred to the physical environment within which services are produced and consumed (Bitner, 1992), the servicescape concept has evolved through the inclusion of the social settings, interactions and practices defining social servicescape (Tombs and McColl-Kennedy, 2003; Line *et al*, 2018). According to the findings of this study, the Oxford Road Corridor can be considered as a smart servicescape on the ground of its physical settings (e.g. university campuses, science parks and cultural venues) for all ICTs-based innovations, artistic, cultural and other leisure activities. It could be also deemed as a social servicescape considering the influence on the situational practices and interactions linked to festivals, conferences and social events. Even if the findings did not provide the same level of depth found in the literature concerning the internal mechanism and elements of social servicescape (Rihova, 2013; Line *et al*, 2018), it can be argued that they suggest a further expansion of the concept in relation to the digital-physical context of smart ecosystems influencing value creation practices and processes (Roy *et al*, 2019).

Smart city strategy

The Oxford Road Corridor has been part of the smart city strategy, which is essentially based on the deployment of smart city projects and related events. By being the technology testbed for smart city initiatives, the Corridor embodies the spatial and digital innovation strategy envisaged in the urban smart agenda of the city council. In addition to the role of smart city demonstrators, the practical meaning of such projects entails the development of smartness

across components that are also common to smart destinations (Buhalis and Amaranggana, 2013). With regard to CityVerve, some of the fundamental construct of smart cities, such as *smart living* and *governance*, were found to be associated with elements of smartness that are distinctive of Manchester, like *creativity and innovation*. Smart city projects have been widely regarded as enablers of knowledge-based processes and practices for value creation (Anttiroiko *et al*, 2014; Angelidou, 2017; Ardito *et al*, 2019b), with implications for cross-organisational collaboration, citizens' participation and effective governance (Viale Pereira *et al*, 2017; Willems *et al*, 2017). The influence of CityVerve and the other similar projects across the Corridor, including city centre, concerned all components of the value creation process.

The city council policies enclosed in the *smart urban agenda* framed the discourse over the development of Manchester as smart city and favoured a collaborative environment enabling innovations, public-private-consumers partnerships, people's engagement and participation as well as the exchange of resources. This strategic approach was furthered by conferences, seminars, and other events as dedicated settings for knowledge sharing, raising awareness of the impact of data and smart ICTs on local communities as well as future urban planning. As an integral aspect of CityVerve, smartness was recognised as a way of competing with other destinations through the application and extension of use cases beyond the boundaries of the project. Hence, the participation in the SynchroniCity project within the Europe's Horizon 2020 programme built on the CityVerve experience to create a data-driven marketplace across different European smart cities. Nevertheless, this kind of projects present several issues concerning their scalability and replicability at local and international level. As pointed out by van Winden and van den Buuse (2017:52), policymakers and funders of smart city projects have recognised that 'the lack of scaling [and replication] is widely perceived as a major problem that needs to be addressed [...] on all levels', since many projects 'remain small and experimental, and fade out after a (subsidised) demonstration phase; as a consequence, the impact of solutions developed in these pilot projects on urban development often remains limited'. While the scalability refers to the extension or expansion of the whole project or solutions at wider city scale, the replicability concerns the successful replication of the project or solutions in another organisational or geographical context, namely the same city or another city). In the light of the social, cultural, technological and cultural changes involved in such a propagation

(Meijer and Bolıvar, 2013; Bosch *et al*, 2017), the smart city projects replicability and scalability can be considered as context sensitive and depending on efficient knowledge transfer (van Winden and van den Buuse, 2017; Ardito *et al*, 2019b). Even if participants in this study did not reveal detailed elements of such challenges, they expressed concerns towards the long-term value of smart initiatives, their socio-economic sustainability and impact on the city by addressing the continuity and permanency of smart projects. While the SynchroniCity project can be ascribed to the attempt of replicating the positive smart experience of CityVerve at international level and with a particular focus on data-driven solutions, the potential for upscaling CityVerve use cases at wider city level has yet to be fully explored and assessed (Caird and Hallett, 2019).

Institutional arrangements

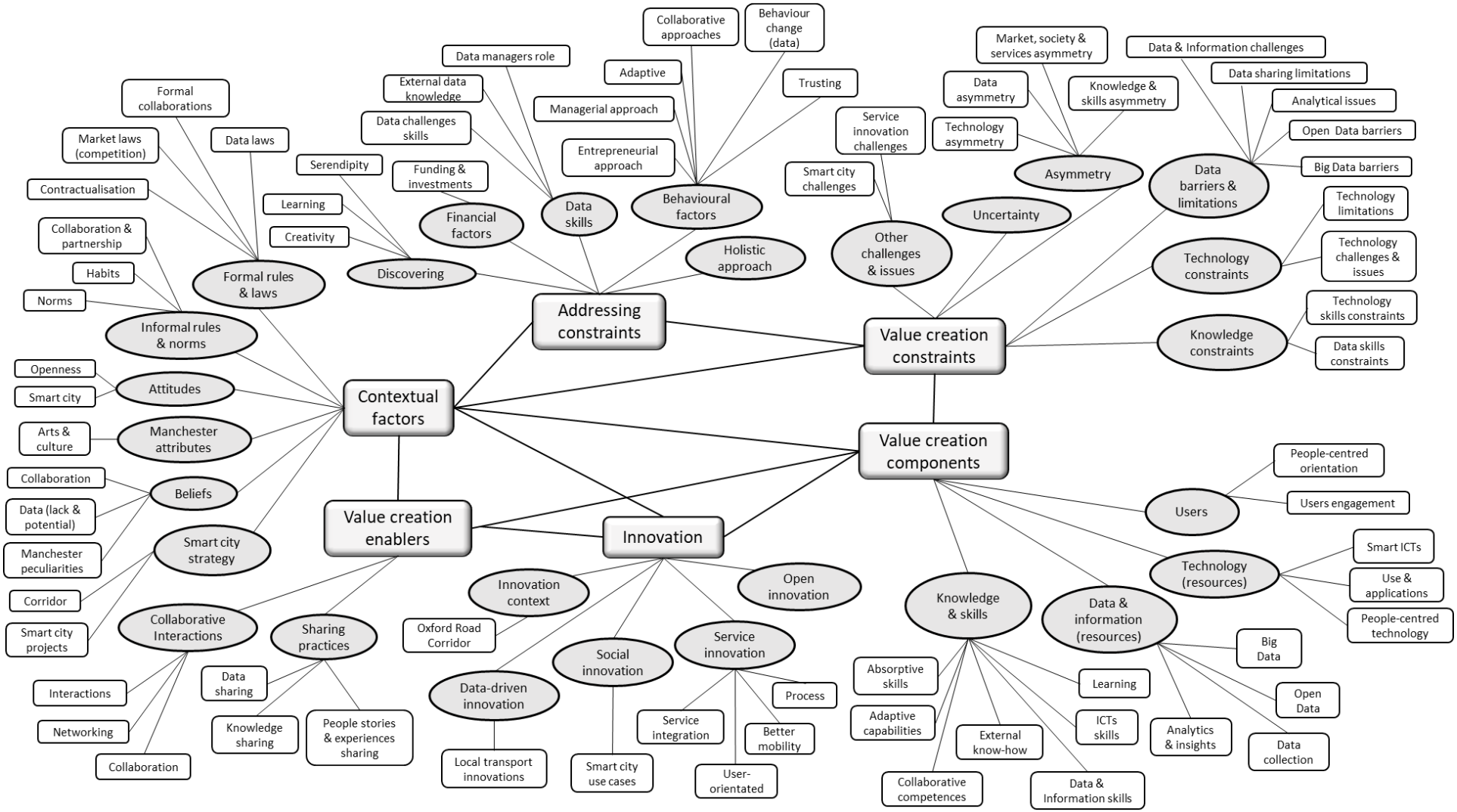
From S-D logic and Service Science perspective, the creation of value in a smart tourism ecosystem strongly depends on institutions and institutional arrangements (Barile *et al*, 2017; Polese *et al*, 2018). As explained by Lusch and Vargo (2014a:24), value can only be co-created in any service ecosystem through 'resource-integrating actors connected by shared institutional arrangements.' The discussion of institutions provided in this section requires a further consideration of the interrelated set of combined institutions (Vargo and Lusch, 2016). By addressing the relationship between some key components of institutions identified in this study, it is possible to gain a holistic understanding of the value creation process in the smart Corridor ecosystem. As such, the main institutional arrangements discussed hereafter refer to tangible and intangible attributes of the city; smart city policies; formal and informal attitudes and feelings. Collaborative interactions as well as data and information sharing practices were supported by the strong attitude towards openness, collaboration, and trust in the opportunity of working together to innovate existing services or create new solutions for better residents and visitors' experiences. Such a positive belief in the open and collaborative context of Manchester prompted the people-centred view of smartness, alongside a user-driven approach to smart ICTs and more focus on open data than big data. The development of collaboration competences over time was clearly influenced by these contextual factors, even if the broad willingness to collaborate did not equally match the actual cooperation across local actors and the sharing of resources. Formal institutions concerning data protection and market competition rules and laws, respectively affected the effective data/information

exchanges and collaborations on the ground of different competitive objectives within and across sectors operating in the Corridor, at both public and private level. Hence, the influence of informal institutions, like entrepreneurial behaviours, over the approach to address the lack of data and knowledge resources through unregulated cooperation and participation in smart city projects. As part of the smart urban strategy, for example, CityVerve enabled the distinctive open, collaborative, and innovative environment across the smart Corridor, against the asymmetries and constraints to value creation identified outside the smart city projects. The most common institutional traits having an impact on enablers, constraints and components of value creation could be found in formal and informal institutional patterns across the Corridor context. Accordingly, the institutional arrangements restraining and regulating the access, sharing and integration of resources depend on the physical settings as much as the beliefs and attitudes towards smartness.

8.6 Reviewing and enhancing the preliminary conceptual frameworks

This study has uncovered several crucial elements characterising value creation in a smart destination. To enhance understanding of the phenomenon, two preliminary conceptual frameworks have been proposed as interrelated in their structural and procedural nature (Section 4.4). The analysis performed on available data (Chapters 6 and 7) has allowed the revision and enhancement of both conceptual frameworks, including their combination to present a holistic view of the phenomenon. This will be addressed and presented hereafter in relation to the major themes generated from the primary and secondary data analysis (Figure30). The preliminary structural framework (Figure 20) is reviewed in relation to the *Contextual Factors* major theme, related sub-themes and categories, with reference to the case of Manchester. Considering the specific influence of contextual factors on the value creation process, the components of value creation have also defined some of the major constructs of the framework in terms of their mutual relationship. Figure 31 shows the modified and extended structural framework. The basic layer of the smart Corridor ecosystem has been identified as *servicescape* defined by the combination of its physical settings, technical infrastructure, and social systems (Line *et al*, 2018; Roy *et al*, 2019). As a smart place, the Corridor benefits from the concentration of several cultural venues, hospitality facilities and universities with research centres that are all well connected to the airport and city centre through an integrated transport network.

Figure 30. Final thematic network map



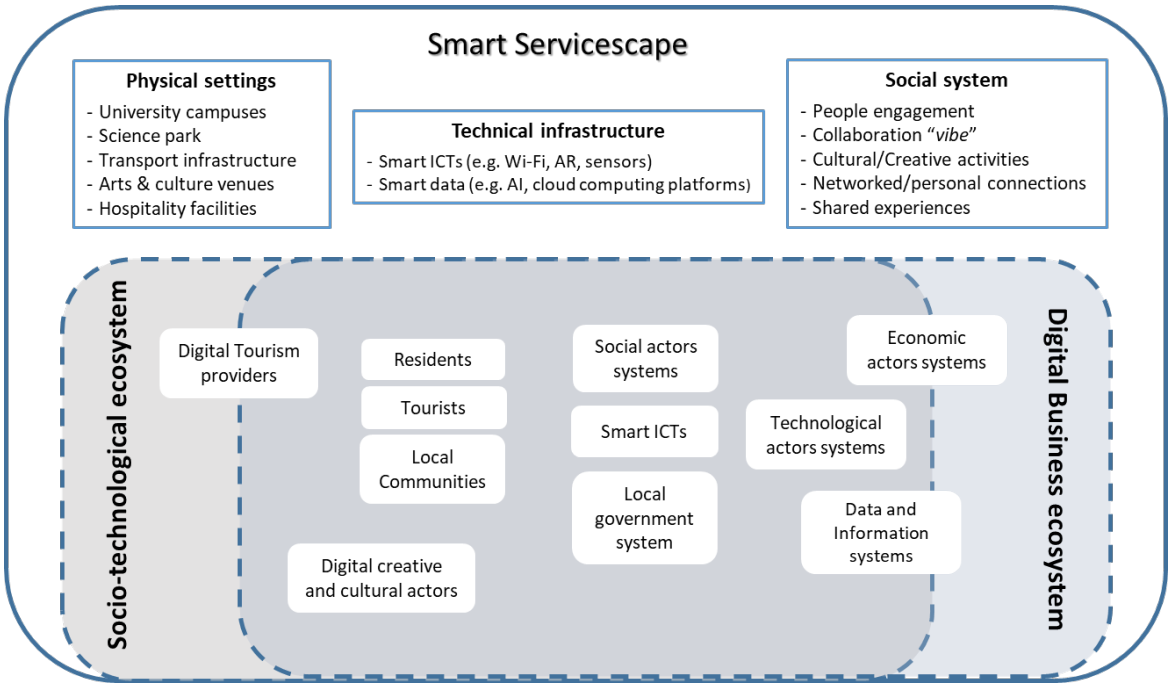
Rather than distinct individual technology systems, smart technologies are embedded into the physical environment as a distributed and networked digital infrastructure supporting the real-time interactions of people, inter-organisational collaborations, socio-cultural activities and the exchange of experiences defining the social system at destination level. The digital infrastructure entails those smart technologies (e.g. AI and cloud computing) helping to manage and parse the amount of data produced by the physical, digital, and social fabric of the Corridor. The interplay between the socio-technological and the digital business ecosystems can be seen enshrined within this environment. The analysis of the findings in this study has helped to assess their blurred boundaries and overlapping level, with *economic actors* and *data and information systems* that did not show full engagement with the socio-technological ecosystem (e.g. competition rules preventing actionable data sharing to improve services). Similarly, the entwined relationship of the *digital tourism providers* system with the digital business ecosystem appeared to be limited in terms of the unexploited potential of public-private-user collaborative interactions and embryonic open networked systems.

The social, technological, digital creative and cultural actors shared elements common to both ecosystems. With small differences pertaining their respective nature, they were all acting as interconnected agents interacting and sharing resources one another to explore provide and/or enhance context-specific services for residents and tourists. This is also the case of digital innovation actors co-designing technology-mediated experiences with local communities engaging with art, smart ICTs and events. Drawing on smart technologies and open data management, the local government system played the key role of facilitator for the development of smartness across Manchester through participatory governance and public-private-user collaborations according to the smart urban policies. In line with this, the people-centred view of smart ICTs and their instrumental view presented across the Corridor's ecosystems consistently with the blurred role of local communities, residents and tourists widely considered as users.

Such a cyber-physical and social context supports the services co-production, provisioning, consumption, and enhancements (Cassandras, 2016), with influence on the value creation process and the related integration of socially based knowledge, smart technology, data, and information as key components. The combination of the tangible elements with the social and digital realm has been commonly recognised as a significant concern for smart

destinations development (Baggio and Del Chiappa, 2014; Gretzel *et al*, 2015a; Jovicic, 2019), with implications for the role of institutions and institutional arrangements in the co-creation of value (Vargo and Lusch, 2016; Barile *et al*, 2017).

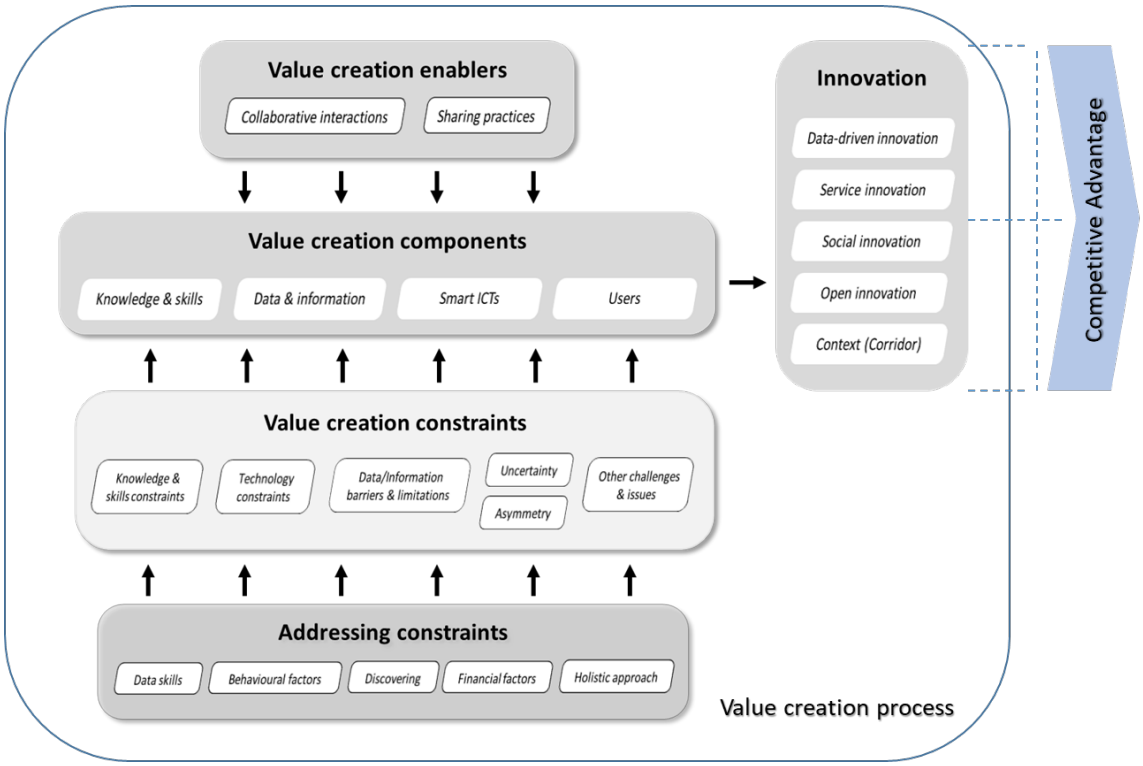
Figure 31. Reviewed and extended structural framework



The preliminary procedural framework (Figure 21) included all the key components of the value co-creation process (i.e. knowledge, technology, data, and information) in the smart Corridor ecosystem depicted in terms of their mutual relationship. The analysis of findings, discussed in relation to the literature and conceptual propositions (Sections 8.2, 8.3 and 8.4), helped in reviewing and extending the preliminary procedural framework (Figure 32). As a result of the abstraction process, the value creation process can be defined through the higher-order themes relationship. As linchpin of the entire process, the value creation components (knowledge and skills, data/information, ICTs, and users) are crucial to the different types of innovation for the competitive advantage of the city and actors thereof. The combination and integration of the components for value creation, however, can be enabled (*value creation enablers*) or constrained (*value creation constraints*) by each and all respective factors, with potential mitigation or removal of the barriers and limitations (*addressing constraints*). This conceptual construct shows the main procedural elements to be considered when looking at value creation in a smart destination. Still, it is possible to gain a better understanding of the process by looking at the fine grain details of themes

in relation to the literature and the propositions suggested in this study (Section 4.4). The incorporation of users into the *value creation components*, along with data, information, smart ICTs, and knowledge, expanded the initial view of the value creation determinants.

Figure 32. Reviewed and extended procedural framework



Given the supply-side stance of this study, it suggests further lines of inquiry that are more in line with the prominent arguments in S-D logic literature (Section 9.5). In this study, however, *users* should be considered in relation to the other value creation components, and not in terms of their perspective. Without distinction between their types and roles, as discussed earlier for the structural framework (Figure 31), the users were recognised as active participants to the value co-creation process involving the integration of knowledge, technology, data, and information. This was evident, for example, in the testing of smart services and solutions by users (application of their knowledge and skills), the people-centred orientation towards smart technologies and the views about open data or user-centred data and information management (Sections 6.3.4 and 7.3.3). This is consistent with the S-D logic, smart tourism and strategic management theoretical underpinnings, respectively in terms of the role of users/customer for the co-creation of value in service ecosystems (Vargo and Lusch, 2017), smart actors in tourist destinations (Femenia-Serra

et al, 2019) and the involvement of all stakeholders in the management of knowledge within a smart destination (Del Chiappa and Baggio, 2015). As a resource to be integrated into the value creation process, data and information were mainly considered as "raw material" produced by immersive smart technologies (e.g. sensors and AR) and collective technology-mediated interactions of users to be collected, processed and/or shared across the Corridor. Within this smart service ecosystem, smart ICTs played the role of medium and outcome of human activities, which aligns with their definition of operant and operand resources for value co-creation and service innovation (Orlikowski, 1992; Akaka and Vargo, 2014; Troisi *et al*, 2019). In their entwined relationship with smart technology, data and information were found to be the prominent resource when compared to the increasing availability and easy access to advanced ICTs. This was evident from the emphasis placed upon data-driven innovations and particularly the skills related to the parsing/processing of data, including the lack thereof (as discussed later for *Value Creation Constraints*).

Similar to what contended for the *users* component, several authors (Wang *et al*, 2013; Fuchs *et al*, 2014; Del Vecchio *et al*, 2018; Bu *et al*, 2020) have observed the significant role of data skills for value co-creation in smart destinations thoroughout the theoretical underpinings of this study. Other forms of knowledge and skills, however, should be also considered for resourcing and in combination with data and information capabilities. To a similar and lesser extent than adaptive and absorptive skills, the integration of external know-how and collaborative competences revealed the socially based nature of knowledge for inter-organisational interactions and cooperation as well as service and social innovations (Pellicano *et al*, 2018; Ardito *et al*, 2019b). The enabling role played by *collaborative interactions* and *sharing practices* could be seen in terms of their respective nature and implications. Different forms of collaboration stemmed from face-to-face and technology-mediated social interactions, with explicit aim of co-creating or enhancing services. Experiences, skills, data, and information sharing practices helped an effective value creation resourcing. Combined with collaborative interactions, data and information sharing was essential to the development of an open data environment as much as innovative social and service solutions based on data-driven decision making. By referring to smart city initiatives in the Corridor, this enabling role of data, information and social interactions was evident in the inter-organisational ability of cooperating through an exchange of data and skills. In line with the literature advocating value creation in smart

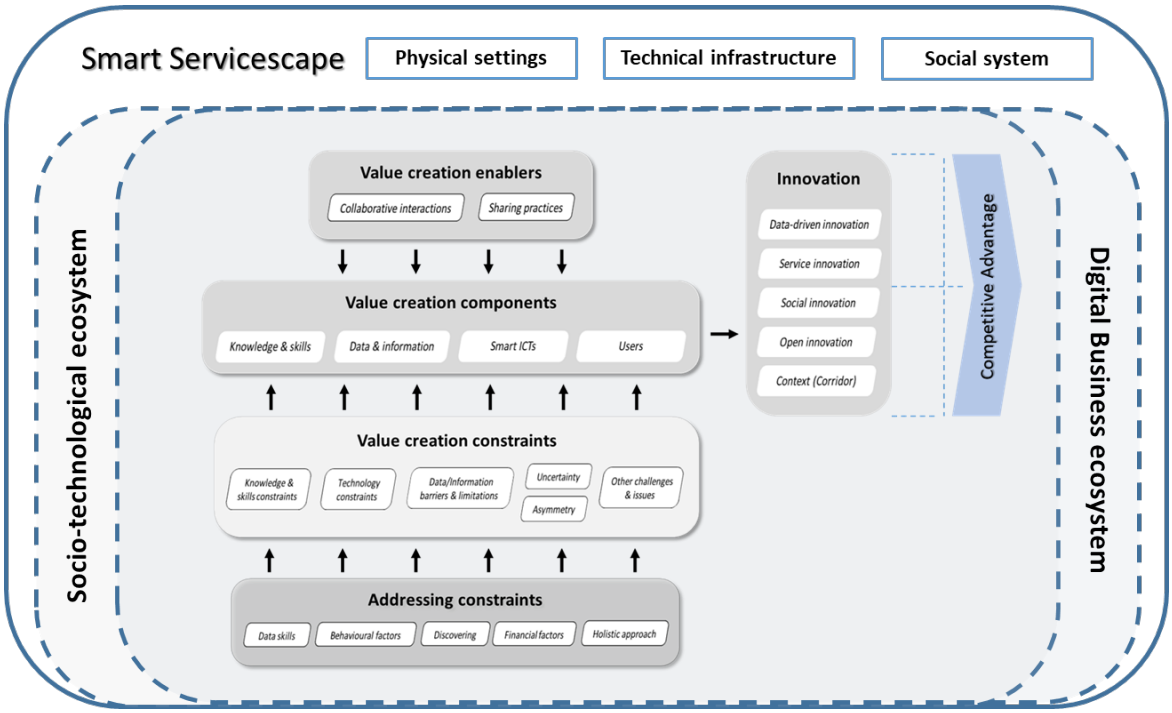
service ecosystems (Vargo and Lusch, 2011; Park and Vargo, 2012; Del Vecchio *et al*, 2018), services and value creation arose from key resources sharing as part of the collaborative relationship across local actors involved in the process (Buonincontri and Micera, 2016). In its diverse forms occurring within the Corridor, innovation can be triggered by the value creation components when supported by collaborative interactions and sharing practices (v*alue creation enablers*). Given the emphasis placed on data resources and data skills, data-driven innovation was associated with enhanced experiences and decision making of users. Clearly, the combination of data skills and smart data ICTs resources (e.g. AI, APIs, and cloud computing) play a critical role in the processing of and provisioning of real time data. This also holds true for service and social innovation, which is respectively embodied by the reconfiguration and acceptance of the value propositions for improved experiences in the Corridor (e.g. cultural events, transport, hospitality) and inclusive wellbeing of local communities. The engagement and active participation of users characterised all forms of innovation presented in this study. Similarly, the *value creation enablers* were recognised as key drivers of innovation in relation to the effective application of sharing practices and collaborative competence to smart ICTs and all other value creation components (Ordanini and Parasuraman, 2011; Trunfio and Campana, 2019). *Open innovation* provided specific evidence of such a crucial role of value creation enablers, collaborative knowledge, open data environment and related smart technologies as widely acknowledged in the literature (Boes *et al*, 2016; Del Vecchio *et al*, 2018; Williams *et al*, 2020). The competitive advantage of the smart destination can be, therefore, attained through an endogenous value creation process based on collaborative and sharing practices enabling the integration of systemic and pertinent value creation components to produce or aggregate the different forms of innovation. The value creation process, and in turn innovation, can be hindered by factors particularly related to its core components. The main *value creation constraints* emerged from the asymmetries identified in the data, information, and ICTs, along with the lack of analytical skills (Appendix 27). While the systemic interoperability, implementation and integration of diverse technologies showed limited concerns, the limited availability of actionable data, the lack of access to data and information as well as their heterogeneous and unstructured format were identified as the major constraints. The same differences were found in relation to knowledge barriers and limitations, with the lack of data skills pertaining analytical capabilities acknowledged as more common than the shortage of

technology know how. This was also associated to the limitation and barriers preventing open data and big data development, with regard to the lack of a compelling business case and poor analytical implementation respectively. As shown by the findings (Section 8.5.4), the data and ICTs asymmetries were mainly associated with the access to resources and know-how or specialised knowledge. Additional constraints were also identified in the divergent strategic view of public and private actors, with implications for the governance of smart city initiatives beyond the Corridor.

The different ways of *Addressing the Constraints* were presented as practical solutions to specific issues, barriers, and limitations, without overlooking a broader holistic approach considering the overall impact of constraints against their individual implications. Despite being identified as distinct from other elements, the overarching and systemic approach to constraints cannot ignore the single activities and practices suggested or adopted. To face the challenges and issues related to the lack of resources, for example, a combination of managerial and entrepreneurial behaviour was deemed to be effective in the response to the shortage of data resources and knowledge using collaborations at personal and organisational level (Eichelberger *et al*, 2020). To face the data skills constraints, external know-how was embraced as a complement to internal competencies. A different approach to data or knowledge-related constraints could be also supported by *discovering* new ways of facing them through creativity and learning activities (Audretsch and Belitski, 2013; Anttiroiko, 2014). The smart initiatives (SynchroniCity and CityVerve) challenges and issues were linked to their sustainability, the potential asymmetries in accessing critical value co-creation resources (i.e. data, ICTs and knowledge) and the need of financial solutions built around crowdfunding and local public-private partnerships.

Figure 33 provides a comprehensive view of the value creation process within the Corridor through the integration of the procedural framework into the structural framework of the smart servicescape. Even if the socio-technological and digital business ecosystems were not fully overlapping, the value creation process and its major dimensions could be placed at the convergence of both ecosystems resulting from analytical evidences. In itself, the conceptualisation of the meaningful elements involved in the co-creation of value to gain competitive advantage entailed an (eco)systemic approach to the phenomenon, with the generation of conceptual constructs that sustained, rebutted and expanded initial views according to the findings.

Figure 33. Integrated structural and procedural framework



The role of data, information, collective knowledge-based practices, and social interactions (Proposition A) was detailed as for their respective diverse nature and allocated within the dynamics of the value creation process. For example, data and information can be viewed as enablers when they are shared across local actors and deterrent in case of their lacking. The same applies to any form of socially based knowledge practices and interactions. The fact that collective knowledge practices combined with smart ICTs can support the service innovation co-production, and eventually gain competitive advantage (Proposition B), was recognised as not the only form of innovation. Considering the effective application of the collective knowledge as essential to resourcing activities (e.g. social and open innovation), the data and information resources were also identified to be significant. Similarly, socially based knowledge management emerged as a critical approach, and yet alongside other significant ones, to mitigate and/or reduce uncertainty and asymmetry constraints, which were not mutually related and with a limited impact on value creation and innovation by the former then the latter (Proposition C). In the final analysis, the holistic view of the value creation process as embedded in the smart Corridor ecosystem confirmed the influence of institutions and institutional arrangements on the inter-organisational knowledge for the co-creation of value (Proposition D), while providing a structural overview of the tangible and intangible dimensions of the servicescape.

8.7 Chapter conclusions

In this chapter, the key findings and the concepts generated from the explorative and the complementary analysis of the value creation process within the Oxford Road Corridor are discussed in connection with the reviewed literature and each of the propositions. With attention to the body of knowledge related to the research problem and the objectives of this study, the discussion of the findings illustrated the concepts enriching and expanding the knowledge of the value creation process, including the significant elements playing a role in enabling, limiting and influencing it.

This critical discussion confirmed the determinant role of knowledge and skills as strategic component of value creation and source of innovation, in its collaborative form associated with the use of smart ICTs. Collaborative interactions and data skills appeared to be highly relevant in facilitating the overall value creation process, and the lack thereof is a significant constraint, in comparison to the less influencing asymmetry and uncertainty.

The overall discussion of findings sustained the review and enhancements of preliminary conceptual frameworks, which are outlined in their individual and integrated configuration. Based on the empirical evidences peculiar to the smart Corridor, the enhanced and refined conceptualisation of the procedural and structural frameworks provides rich insights on the value creation process situated in the overlapping socio-technological and digital business ecosystems of the smart Servicescape. In addition to the aforementioned key role played by knowledge and skills, this holistic view of the process provides a better understanding of the value creation process as embedded in the smart Corridor and consistent with the smart service ecosystem conceptualisation in the extant literature.

In conclusion, the discussion of the most significant findings and concepts in respect to the existing literature enriched and expanded knowledge of value creation in a smart tourism ecosystem. As such, the critical arguments embraced in the development of the conceptual frameworks and the empirical study present theoretical and practical implications as well as limitations and ground for further lines of inquiry in the strategic management, service marketing and smart tourism domain. Each and all of these aspects will be addressed and summarised in the next conclusive chapter.

Chapter 9. Conclusions

9.1 Introduction

The purpose of this research was to explore and expand the theoretical underpinnings and practical knowledge of value creation in smart destinations, from supply-side perspective. This overarching purpose was expressed through the aim of understanding *the relationship between inter-organisational knowledge, data, information, and value creation in smart destinations as a means for their competitiveness*. The research objectives developed to achieve the research aim concerned an extensive critical review of the literature to identify the preliminary propositions, concepts, themes and gaps to be addressed (Objective 1); the examination of data, information and inter-organisational knowledge to analyse their respective influence on the value creation process (Objectives 2 and 3); the examination of the role of institutions (e.g. shared rules, norms and beliefs) affecting data, information, smart ICTs and knowledge (Objective 4); the development of a conceptual framework to better understanding the value creation processes to enhance competitiveness of smart destinations (Objective 5).

The research adopted a holistic single-case study design based on qualitative methodology and an interpretivist approach. Following the review of the extant literature pertaining the S-D logic, smart tourism and strategic management research domains (Chapters 2 to 4), four propositions were presented as loose statement (Section 4.4) providing guidance and direction for the collection, analysis and discussion of findings. The issue of developing the propositions in a qualitative study and their specific implications in the inductive reasoning of this study were addressed and clarified in terms of their role against *a priori* hypothesis and flexibility of the case study design employed (Chapter 5.2.1). With explanation of the role played by both primary and secondary data, the chapters presenting the findings were structured and organised according to the themes that were generated from the analytical developments (Chapters 6 and 7). To answer to the research questions, the six high-order themes supporting the conceptualisation of the value creation process in the Oxford Road Corridor were discussed in consideration of the four propositions to preview and enhance the preliminary conceptual frameworks (Chapter 8). Based on the conceptual relationship between the major themes, an overarching framework was presented as a combination of the enhanced structural and procedural frameworks (Section 8.6).

This chapter will summarise this study by addressing the primary and secondary research questions (Chapter 1.5), before sustaining the importance of the research, its significance and contribution. In doing so, potential future directions of inquiry will also be suggested to extend and/or expand the findings of this investigation.

9.2 Addressing the research questions

The research problem that inspired this study is related to the very limited attention to the socially constructed view of smart tourism in relation to the notion of value co-creation. Despite the growing interest in value creation as determinant of smart tourism destination competitiveness and the integration of a socially based view of service ecosystems, there is still a strong view of knowledge as a component of smartness (along with data and smart ICTs) that can be easily shared, acquired and integrated for the co-creation of value in any smart destination. To respond to this gap found at the convergence of S-D logic, strategic management and smart tourism, this study attempted to answer to the primary question: *How can value be created in a smart tourism destination?* This question and all other sub-questions (Section 1.5), developed to narrow the focus of the main research question and help in answering it, will be addressed hereafter in this section.

Answering the primary research question

The value creation components are identified as the linchpin of the entire value creation process in the smart Corridor. Data, information, smart ICTs, knowledge, and users play a critical role in the co-creation of value depending on their combination and/or integration. The entwined relationship between data, information and advanced ICTs characterises the smart service ecosystem of the Corridor, with strong implications for the production and improvement of services ranging from transport and events to local communities' social well-being. The integration of these prominent resources (i.e. data, information, and ICTs) requires the application of the knowledge generated across stakeholders, at local level and with particular emphasis on data skills. This reflects the data and information resources significance over technology, which is recognised to be increasingly distributed and easy to access at lower costs. Regardless of their role, however, users cannot be ignored on the grounds of their active participation in the service co-production and resourcing activities to create value. Rather than distinct constructs, all the components should be regarded as connected one another. This applies to all structural and procedural elements of the value

creation process. Each of the value creation components can support urban innovation. But, the different forms of innovation should be considered as integrated to achieve and maintain the smart destination competitiveness as much as the determinants of value creation. The smartness of a destination incorporates innovations that could be driven by an effective use of data and open environments supporting those better practices having a positive impact on residents and public/private services. This study revealed that open innovation and data-driven innovation is essential to enhance the quality of residents and tourists' urban experiences, which can be a distinctive characteristic of the destination aiming at competitiveness. The effective and essential contribution of the value creation components to the overall process, including innovations, is sustained by collaborative interactions and sharing practices. Such prominent value creation enablers are deemed as essential in terms of their combination within the overall process. In fact, the collaborative interactions facilitate the exchange of the core resources among all local actors involved for their integration through the application of external know-how and skills.

Table 44 Addressing the research sub-questions

Research sub-questions	Answers
1. *What kind of inter-organisational collective knowledge-based practices and social interactions support or restrain service exchanges and value creation?*	Collaboration, ICTs, and data/information knowledge prominence to support service exchanges and value creation. Limited sharing and lack of analytical skills hinder value creation. Collaborative competences as predominant form of knowledge sustained by social interactions.
2. *How service innovation is co-produced and interpreted as a result of the collective knowledge-based practices and smart technologies for competitive advantage and value creation?*	The combination collaborative competences and the people-centred view of smart ICTs sustains the co-production of service innovation and its user-driven interpretations to enhance the quality and level of services for competitiveness.
3. *Why uncertainty and asymmetry linked to data, information and knowledge should be limited in the process of value creation in a smart tourism ecosystem?*	Data, information and knowledge asymmetries prevent the distribution of respective resources, their access, integration and application across actors involved in the value creation process. Uncertainty poses less concerns than asymmetry.
4. *How institutions (i.e. shared rules, norms, beliefs and practices) influence value creation processes in smart tourism destinations?*	The physical settings, technological infrastructure and social systems embody all the shared beliefs, formal and informal rules, norms and attitudes influencing all the dimensions of the value creation process and the combination, integration or application of its core components.

For the creation of value in a smart destination, however, it is also critical to address the challenges, barriers and limitations concerning each of the value creation components (i.e. data, information, technology and knowledge). This study revealed that a holistic approach and a change in the behaviour of local stakeholders towards data and smart ICTs can help in mitigating and overcoming the lack of data expertise and governance of the fragmented application of advanced technologies. This is particularly relevant to asymmetries related to the access to data and information resources and related skills, rather than uncertainties arising from different strategic visions across local public and private actors for the urban smartness development of the city. Alongside a more entrepreneurial approach to value creation components use, discovering new solutions through artistic and creative events or practices involving users can also help in addressing the value constraints. The entire value co-creation process is entrenched in the overlapping socio-technological and digital business ecosystems, within the smart servicescape of the Corridor characterised by the integration of its physical settings, smart ICTs infrastructure and the social systems. Table 44 provides brief answers to the research sub-questions, which helped in understanding better the phenomenon.

9.3 Theoretical significance and practical implications

The significance of this study is entrenched in its contributions to the theoretical domains of value creation in smart destinations and the implications for practitioners. Theoretical contributions can be identified along three conceptual lines: the multidimensional nature of value creation based on the inter-organisational interactions, exchanges and integration of resources; the enrichment and extension of extant literature on the domains defining the theoretical boundaries of this study; a conceptual framework eliciting the meaning and understanding of the value creation process within a smart service ecosystem. At the same time, this study seeks to provide practical knowledge to all actors and local stakeholders concerned with value creation and smart destination development.

Theoretical significance

This study conceptualises value as co-created through a systemic process based upon the application of inter-organisational knowledge-based practices for the integration of core resources (e.g. technology, data and information) occurring within the smart Corridor. This holistic and systemic view of value creation in smart service ecosystems has been already

embraced in literature, to a certain extent (Pellicano *et al*, 2018; Polese *et al*, 2018). This study provides new and valuable empirical evidences for an enriched understanding of value creation from the multifaceted elements and procedural mechanisms embedded in the intertwined physical, technical, and social settings of the smart ecosystem. While the value creation process was addressed from S-D logic, Service Science orientation and the strategic management theoretical perspective, the contextual pillars of the entire process were sustained by the smart tourism and smart destinations evolving conceptualisation. The novelty of this study can be found in the combination of strategic management and S-D logic view of value creation as key to the development and competitiveness of smart destinations. Although S-D logic has been recognised as meta-theory embracing different research domains (Vargo and Lusch, 2017) and aligning value creation with the key tenets of knowledge management theories (e.g. Karpen *et al*, 2012), few studies have adopted such an integrative approach in the tourism domain (e.g. Evans, 2016) and from the supply side perspective (e.g. Melis *et al*, 2015). While considering the early conceptualisations of smart tourism strongly focused on big data and advanced ICTs (Wang *et al*, 2013; Gretzel *et al*, 2015a), whose role is still regarded as dominant in smart destinations (Ye *et al*, 2020), this study recognised and attempted to expand the recent evolution towards the socio-technical view of cities/destinations smartness (Concilio and Rizzo, 2016; Yigitcanlar *et al*, 2019; Coca-Stefaniak, 2020). In doing so, the socio-constructivist view of knowledge was adopted to address the socially based co-creation of value, and its determinants, as source of innovation and sustainable competitiveness. As such, this study fills the gaps in the very limited constructivist research in smart tourism (Hunter *et al*, 2015), aligns and contributes to the conceptualisation of service ecosystems (Vargo and Akaka, 2012; Letaifa *et al*, 2016; Edvardsson *et al*, 2011; 2018) in smart tourism destinations (Boes *et al*, 2016; Pellicano *et al*, 2018; Polese *et al*, 2018). Without overlooking the essential role of data, information and smart ICTs (Xiang and Fesenmaier, 2017; Del Vecchio *et al*, 2018; Ardito *et al*, 2019a), this study has theoretical significance in advancing knowledge of value co-creation processes in smart tourism destinations and closing the gaps in the extant literature. The theoretical significance can be summarised in the following four key points (Table 45).

- ***Inter-organisational knowledge, Data skills and collaboration competences***

The notion of knowledge as determinant to value creation and competitive advantage is enriched across the theoretical underpinnings of this study. The adoption of the socially

constructed view of knowledge to analyse the value co-creation process in the Corridor reflects the recent developments in S-D logic towards the inter-subjective nature of value in service ecosystems. As discussed in the literature review (Chapter 3), the evolution from the concept of *value in use* and *value in context* to *value-in-social-context* in S-D logic saw a growing emphasis on competences developed, transmitted and maintained through interactions across actors in social systems (Edvardsson *et al*, 2011; Vargo and Lusch, 2017). By showing that analytical knowledge and skills require effective collaboration and resources sharing, this study enhances our understanding of socially based competences for competitiveness and value creation in the socio-technical context of smart service ecosystems (Lim and Maglio, 2019). Although the S-D logic and strategic management theories are recognised as meaningful to value creation and competitiveness of smart tourism destinations (Boes *et al*, 2016; Jovicic, 2019), smart tourism literature has not fully addressed the recent developments of S-D logic and mostly refers to the codified knowledge management practices (Trunfio and Campana, 2019; Mehraliyev *et al*, 2020; Ye *et al*, 2020). This study has also closed some of the conceptual gaps found in both strands of literature mainly focusing on the role of ICTs and data from the tourist's perspective.

- ***Value creation constraints***

The barriers and limitations affecting the co-creation of value in a smart tourism ecosystem have been recognised and addressed S-D logic and smart tourism literature. In the complex and dynamic service ecosystem of smart tourism destinations, the data, technology, and knowledge-based resources are not equally distributed, affordable and accessible to all actors involved in value creation processes (Peñaloza and Venkatesh, 2006; Kitchin and Moore-Cherry, 2020). The tourism market is particularly characterised by asymmetric data and information (Oukarfi and Sattar 2020), with actors making decisions and acting under uncertainty (Park and Vargo, 2012; Polese *et al*, 2018). Considering the growing attention to the co-destruction of value (Smith, 2013; Lintula *et al*, 2017; Buhalis *et al*, 2020), this study extends our understanding of the value creation constraints in smart destinations by showing the prominence of asymmetries over uncertainty. This is essentially due to a high level of confidence on predictive technologies (e.g. AI) supporting decision making based on limited data and information availability. The widespread use of a managerial approach, instead of entrepreneurial behaviours, corroborates the trust in predictive analytics to face uncertainty and asymmetries. Rather than technology (Neuhofer, 2016; Zhang *et al*, 2018),

the findings show that the lack of analytical skills and fragmented access to actionable data could co-destruct value and hinder its creation. With reference to the smart governance and strategic management of smart destinations (Micera *et al*, 2013; Mancebo, 2020), this study identifies the asymmetry between public and private strategic vision for smart urban development as a significant barrier to collaboration, collective management of resources and competitiveness.

- ***Value creation and innovation***

This study extends and enriches the knowledge of service and social innovation in smart destinations. The key theoretical contributions concern endogenous value creation, open data-driven innovations and the role of people, arts, and creativity. As better provision of services or new services enabling competitive advantage (Lusch and Vargo, 2014a), S-D logic view of service innovation is defined by the co-creation of value through an effective resource integration, collaborative competences and institutions (Lusch *et al*, 2007; Lusch and Nambisan, 2015; Akaka *et al*, 2019). In respect to the smart service ecosystem of the Corridor, the findings align to this view and stress the importance of an Open-Data culture over big data and the relational capabilities of local stakeholders to nurture social capital and innovative ways of co-creating value. Rather than uncertainty, the discovering of new solutions to collaborate and use ICTs through the arts, learning and creativity is recognised as enabler of value creation, service, and social innovation. Smart tourism literature tends to associate innovation to the application of advanced ICTs and big data (Hjalager, 2010; Xiang and Fesenmaier, 2017; Ardito *et al*, 2019; Sigala *et al*, 2019), with reference to KM practices grounded in technology-based approached and codified knowledge (Del Chiappa and Baggio, 2015; Zach and Hill, 2017; Trunfio and Campana, 2019). Also, few studies have associated value creation processes to the service and social innovation in smart tourism ecosystems (Polese *et al*, 2018; Ye e*t al*, 2020; Williams *et al*, 2020). In corroborating the key role of open innovation, smart ICTs, institutions, and social capital (Del Vecchio et al, 2018; Agbali *et al*, 2019; Baggio *et al*, 2020), this study provides additional knowledge for the sustainable development of services and wellbeing (social innovation) of smart tourism ecosystems through people-centred innovations based upon the proactive participation of local stakeholders, open data and advanced technological systems that can meet the need of visitors and local residents.

Table 45. Outline of major theoretical contribution

Key findings	Major tenets in literature	Main elements of enrichment/expansion
Inter-organisational knowledge, Data skills and Collaboration competences	• Inter-subjective value creation • Human and social capital • Codified knowledge management	• Knowledge as highly dependent on effective collaboration and resources sharing beyond smart city initiatives. • Prominence of analytical skills over other forms of knowledge
Value creation constraints	• Value co-destruction • Asymmetry and uncertainty	• Asymmetry more relevant than uncertainty • Lack of analytical skills and access to actionable data as major constraints • Public vs private strategic vision on smart urban agenda
Value creation and innovation	• Social and service innovation (Big data) • Human and Social capital • KM and smart ICTs • Uncertainty as driver of innovation • Open innovation, value creation and appropriation	• Open data-driven innovations prominent over technology-based innovation (Open innovation) • People-centred innovations (active collaborations, data, and smart ICTs) • Service and social innovations triggered by discovering, arts and creativity • Innovation enabled by endogenous value co-creation.
Smart tourism ecosystem (Servicescape)	• Smart tourism ecosystem, Smart servicescape (consumers perspective) • Institutions and institutional arrangements • Blurred boundaries (social, physical, digital, business ecosystems) and role of actors • Service system (Service Science), Service ecosystem (S-D logic)	• Socio-technical ecosystem and DBE not entirely overlapping • Collaboration, openness, culture, and creativity key institutional elements influencing smartness, value creation process • Market laws and formal rules prevent data and knowledge sharing.

- ***Smart tourism ecosystem (servicescape)***

The holistic view adopted in this research provides valuable insights into the overall value creation process within smart destinations and enhances the knowledge of smart tourism ecosystems from the supply-side viewpoint. With emphasis on the consumers' perspective (Mehraliyev *et al*, 2020; Ye *et al*, 2020), the S-D logic's service ecosystem concept has been

widely integrated into recent theoretical developments of smart tourism (Boes *et al*, 2016; Femenia-Serra *et al*, 2019; Troisi *et al*, 2019). In comparison to value co-creation, however, the attention to the institutions and institutional arrangements is still limited (Barile *et al*, 2017; Polese *et al*, 2018). This study helps to fill the gap by providing evidence of the key institutional factors influencing the entire value creation process, its components, and the smartness of the destination. Alongside the positive influence of the creative, collaborative and open environment of the city, the market laws (e.g. public services deregulation) and formal rules (e.g. data protection) are deemed as negative institutions preventing data and knowledge sharing. This study embraces the evolving smart service ecosystem and smart servicescape concepts characterised by the blurring roles of the actors and the overlapping of socio-technological and DBE ecosystems within the social, physical and technical multi-layered structure (Gretzel *et al*, 2015b; Line *et al*, 2018; Roy *et al*, 2019). At the same time, it shows that the social, digital, and business ecosystems might not entirely overlap (Figure 31). Thus, it demonstrates the complex, systemic and dynamic nature of the smart tourism ecosystems and how the contextual settings can affect the endogenous value co-creation, innovation and thereby competitiveness.

The holistic conceptual framework Figure 32 summarises the overarching value creation in smart tourism destinations with a simple overview of the process contextualised in the overlapping socio-technological and digital business ecosystems embedded in the tangible and intangible components of the smart Corridor environment. In providing contribution to enhance understanding of the value co-creation phenomenon through incremental steps of knowledge, this study has also produced pertinent and valuable insights for practitioners involved in the management and development of smartness in cities and particularly tourist destinations.

Main practical implications

This study has implications and applications mainly concerning the local smart destinations stakeholders interested in the co-creation of value for service and social innovations to achieve competitiveness. The findings suggest that the application of knowledge and skills is essential to ensure users' active participation and integrate resources (data, information, and smart ICTs). In combination with these insights, the potential interested actors (Table

46) cannot ignore all other dimensions of the value creation process to benefit from the practical application of this study.

Table 46. Main practical applications and implications of the study

Potential interested actors	Practical applications and implications
Local government	Smart city managers and other actors (e.g. DMOs) can use the holistic approach to value creation to devise policies, set up plans and identify the factors enabling or preventing the collaboration with/across local and wider stakeholders.
Stakeholders	Examples include and are not limited to Tourism practitioners, Travel agencies (incl. online), ICTs providers, service marketers and local communities as actors involved in the co-creation of value within a smart destination. They can respectively identify their proactive role and understand the advantages, challenges and constraints enabling or preventing their potential competitive advantage resulting from the co-creation of value and innovation at destination level.
Place managers	They can understand better the importance of the endogenous and effective co-creation of value in relation to the development of urban smartness, particularly for tourist destinations. Practical applications can be, for example, referred to smart governance and destination brand strategies.
Data managers	The key role of knowledge for value creation and competitiveness is not uniquely relevant to data managers. But, the significance of data skills that emerged from the findings can help them in focusing more on such a critical resource, particularly analytical capabilities. They can also benefit from understanding the prominence given more to open data than big data.

The practical applications of the findings, however, should be considered in relation to the holistic approach to value creation in a smart tourism ecosystem context, which sustains and influence the entire process. Therefore, the integrated conceptual framework can be applied by focusing on the specific elements of interest without overlooking the contextual factors influencing them. This implies that all potential actors interested cannot consider the benefits of this study as independently situated in the fundamental role played by the collaboration and sharing practices enabling value creation.

9.4 Challenges and limitations of the study

The peculiarity of this study lies in the exploration of the value creation in a smart tourism ecosystem from the supply-side perspective. Such a rare approach to this phenomenon, however, raised several challenges and presented limitations mainly concerning the topic investigated and the methodological stance adopted. The fact that value creation can be

interpreted as an intersubjective and subjective entity (Hilton *et al*, 2012), depending on the research domain, theoretical and philosophical lens used, was the first conceptual challenge to address in relation to the overall purpose of the study. A similar challenge pertained the conceptualisation of knowledge as source of competitive advantage and crucial resource for value co-creation (Vargo and Lusch, 2011; Schiuma *et al*, 2012; Shaw, 2015), with concerns over the management of codified knowledge (Carrillo *et al*, 2019). The adoption of the social constructivist approach helped in addressing these challenges by clarifying the nature of value creation, knowledge and thereby the phenomenon being investigated. Clearly, the interpretive paradigm defining the qualitative methodology of the study entailed the active role of the researcher (Section 5.2.4), with potential biases distorting the value and quality of findings (Galdas, 2017). This influence of the researcher was earlier addressed in terms of trustworthiness (Section 5.5) to ensure the integrity and rigour of the study, with particular reference to the credibility of results.

Another significant challenge concerned primary data collection and precisely the limited number of interviews collected for analytical purposes. As discussed in Section 5.3.4.2, the critical and time-consuming task of recruiting and interviewing the selected key informants did not result in an expected number of interviews. Qualitative methodologies are strongly characterised by the problematic definition of sampling strategies and participant access (Baker and Edwards, 2012), particularly when adopting a supply-side perspective requiring the recruitment of the key informants working in organisations, which are objectively more difficult to engage and access (Delaney, 2007; Okumus *et al*, 2007). Still, this issue was deemed to be relevant and leading to a noteworthy limitation in the findings due to the holistic single-case study design adopted for the study and requiring substantial evidences from different sources of data. To mitigate and reduce this limitation, the secondary data collection and analysis was carried out as complementary to primary data findings and key to enhance the analytical process (Sections 5.3.4.3, 5.4.1 and 5.4.3.2). The secondary data complementary analysis corroborated the primary findings and complemented the limited number of interviews, while providing the opportunity to find gaps in the overall analysis of the value creation in the smart Corridor. The complexities inherent to the process of value co-creation in a smart tourism ecosystem required a sophisticated theoretical and methodological approach to the phenomenon. As a process resulting from the relationship between the several stakeholders involved (Vargo and Lusch, 2011), value creation needs

to be analysed through a systemic perspective that frame more than dyadic or triadic interactions (Edvardsson *et al*, 2012). The value creation as a complex adaptive process aligns with the concepts of service ecosystem and smart destinations, which are both characterised by non-linear interactions and processes across multiple actors (Pinho *et al*, 2014; Polese *et al*, 2017; Gelter, 2018). Given the elusiveness and resistance of complex ecosystems to a comprehensive definition, the value creation analysis in a smart tourism ecosystem called for a broader theoretical underpinning that increased the challenges of integrating the different theories and contributing to them through an appropriate methodological approach. As such, the study presents limitations connected to the holistic view of the value creation phenomenon, in the attempt of deconstructing its key elements and simplifying understanding of its process in a smart tourism ecosystem for practical applications.

9.5 Future directions of research

This study provides the basis to further enquiries in several potential research areas and domains, along the lines presented hereafter. The smart tourism ecosystem perspective adopted in this study could be enriched and furthered by addressing the role and practices of users in the value creation process. The findings provided evidence of the engagement and involvement of users in resourcing and enabling value creation using socially based knowledge practices, which were not investigated because beyond the scope of this study. Thus, this so-called supply-side view of value creation can be expanded across the different types of users and their contribution to the entire process through various forms of knowledge-based practices, interactions, and relationships. For example, additional findings could be gained by further exploring the emerging role of tourists as "*temporary citizens*" co-creating value and co-producing experiences (Lin *et al*, 2017; Richards, 2017) or the active participation and contribution of local communities in the endogenous developments of urban smartness through value creation and innovation (Pellicano *et al*, 2018). The proactive activities and practices of users (tourists, residents, consumers, and online/offline communities) could also be explored in relation to the data-driven and smart ICTs-mediated experiences affective the co-creation of value and smart destinations competitiveness. The findings concerning the smart Corridor can also offer opportunities for future research concerning the influence of smart destinations context on value co-creation processes and practices. The recent shift of researches from a strong focus on

big/open data and ICTs to the socially based view of service ecosystems and smart destinations ecosystems has not produced an exhaustive amount of knowledge. In addition to the human and social capital (Boes *et al*, 2016; Pellicano *et al*, 2018; Trunfio and Campana, 2019), for instance, future enquiries could explore the integrated role of virtual-physical-social settings by addressing the institutions and institutional arrangements implications for smart tourism ecosystems through the sociomateriality lens (e.g. Orlikowski and Scott, 2013) or expand on the social aspects of the smart servicescape in relation to the service ecosystem and the role of users (Line *et al*, 2018). A further area of research that could draw on the contextual findings of this study can be identified in the challenges imposed by the scalability and replicability of smart initiatives co-creating value beyond local knowledge-intensive ecosystems within destinations.

The role of culture and creativity is another potential line of research. Future enquiries can benefit from the findings identifying the influence of the different cultural factors on the value co-creation and innovation at structural and procedural level. This study showed that cultural events, practices, and activities were recognised as determinant of the destination identity as much as important to those socio-technological interactions and experiences sustaining the integration of resources and tourism-related value propositions. This area of research has increasingly received the attention of value co-creation (Akaka *et al*, 2013; Alves *et al*, 2016) and smart tourism scholars (Tom Dieck and Jung, 2018). Richer insight might be gained through the investigation of the cross-cultural dimension of value and creative tourism experiences to expand the notion of urban smartness and knowledge beyond the consumer culture perspective. The researcher's peer reviewed publications on smartness, creativity, value creation and innovation in tourism (Appendix 29) can provide some potential indications for future research directions in this specific field.

Innovation has been widely addressed across all theoretical domains of this study, with common traits concerning data, smart ICTs, service ecosystems, codified knowledge and openness (Skålén *et al*, 2015; Tsai, 2016; Edvardsson *et al*, 2018; Akaka *et al*, 2019; Polese *et al*, 2019). With knowledge management at the core of the innovation and value creation processes, the adoption of the same socially constructed view of knowledge of this thesis can expand existing understanding of the different forms of endogenous innovation within smart tourism ecosystems. In-depth knowledge of service and social innovation enhancing competitiveness of smart destinations could be gained by drawing on the significant role

of data knowledge and skills or expanding on the limited evidences of entrepreneurship behaviour and uncertainty presented by this study. This can be interpreted in line with the recommendations of Williams *et al* (2020) for a future research agenda including the ability of firms (individually and collectively) to develop innovation by responding to uncertainty, identifying and absorbing knowledge through the ambidextrous approach of exploration and exploitation.

Lastly, a further line of research might concern the co-destruction of value in smart tourism destinations. Commonly identified as the negative side of the value creation process, value co-destruction has been recently emerged and addressed in terms of failed interactions and/or integration of resources across actors of service ecosystems resulting in decreased well-being outcomes (Plé and Chumpitaz Cáceres, 2010; Smith, 2013). Despite the growing interest in the S-D logic and smart tourism (Echeverri and Skålén, 2011; Plé, 2017; Buhalis *et al*, 2020), the phenomenon still lacks wider understanding and knowledge in comparison to the amount of research within the respective domains (Lintula *et al*, 2017). Given this need to conceptualise the concept within smart destinations, research can be furthered by drawing on the different factors underpinning the value constraints dimension of the value creation process presented in this study.

9.6 Personal reflections and conclusive thoughts

This final section will present the researcher's personal experience and final thoughts on this PhD research. The challenging, dynamic, and rewarding journey through this research endeavour started from my dedication to personal continuous development and learning. The journey started from the opportunity of a scholarship proposal to investigate value creation in smart tourism destinations as a phenomenon based on the use of data, smart ICTs, and knowledge. With an extensive professional background in the wireless industry at international level and academic studies in destination management and economics of tourism, the choice of engaging in research within the smart tourism field appeared to me as a natural course of life and I was lucky to explore a domain of research of strong interest to me. The fact that the study developed in a slightly 'different way' from the initial idea of focusing more on data, rather than the socially based knowledge, can be an example of how the PhD research evolved alongside personal beliefs. In the light of the complexity of the phenomenon being investigated, as stated throughout this thesis, the most challenging

steps concerned the identification of theoretical boundaries and a suitable methodological approach consistent with the ontological and epistemological stances of the research. As a highly rewarding experience for a researcher, the review of the literature and as well as resulted in an immersion into the different views of the structural and procedural elements of the phenomenon that strengthened my confidence in its foundational aspects as much as the "*ownership"* of the PhD study. Similarly, the time-consuming task of collecting and analysing data showed me the difficulties in accessing informants working in organisations and carrying out qualitative research solely based on interviews. Across the entire process of the PhD, I have also learned a lot about time management and deadlines in academia. When I passed the final Viva with revisions and started working at the University of Central Lancashire as lecturer in strategy, I strongly engaged in organising and managing the time needed to complete the PhD and comply with my academic staff duties. All of this tested my capabilities as researcher and lecturer, with an invaluable acquisition of knowledge and experience that I will be happy to develop further and share with colleagues and students.

Given the complex and sophisticated nature of this PhD research, my final thoughts pertain the philosophical, methodological and analytical decisions made to ensure that findings could help in advancing knowledge in a field of research that seems reluctant to definitive definitions and enhancing people's wellbeing when dealing with actual urban smartness. Addressing such a difficult and complex area of research involve "*risks*" and challenges that have to considered in any related attempt to improve clarity of value co-creation in a STE or any other ecosystem. Lastly, the writing up of the PhD thesis was completed during the 2020 COVID-19 pandemic, which has posed critical challenges and high risks to the global economy and particularly the tourism sector. Future inquiries in smart tourism research domain will have to consider the socio-economic impact of the pandemic and the efforts required to carry out researches in such an unprecedent and exceptional situation.

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Appendix 1. Co-Creation in tourism: systematic mapping

Research Domains	Hospitality	Travel services	Tourism marketing and management (including Destination)	Tourism attraction and events
Area-Context	Hotels (31); Hospitality (12); Restaurants (5); Resorts (2); Accommodations (2)	Travel agency (10); Tour services (3); Airline and transportation (2); Local agencies (1)	Tourism (14); Tourist Destination (13); DMO (3); Destination marketing (1); Smart tourism (1); Tourism Marketing (1); Dark tourism (1); Tourism firms (1)	Heritage (9); Attraction (7); Park (5); Cultural tourism & museums (4); Adventure & Wildlife tourism (3); Festival & Event (2); Spa & Wellness (1); Family Vacation (1)
Main Theories	Consumer culture (33); S-D logic (33) Experience-related (10); Innovation (6); Value creation (5); IS & ICTs (5); Social exchange (4); Service (Eco)System (3); Social Capital (2); Customer-Dominant logic (2); Customer co-creation (1); Social network (1); Social practice (1); Social entrepreneurship (1)	Consumer Culture (11); S-D logic (8); Resource-based theory (2); Value co-creation (1); IT (1); Social practice (1); Social exchange (1); Experience economy (1); Experiential marketing (1)	Consumer Culture (19); S-D logic (9) Destination Marketing (5); Innovation & ICTs (3); Co-creation (2); Social-Context-Mobile (1); Smart tourism destination (1); Experience co-creation & ICTs (1); Value co-creation (1) Resource theory (1); Social exchange (1); Service Science (1); Network theory (1); Value theory (1)	S-D logic (9); Consumer Culture (6) Experience economy (6); Customer-Dominant logic (4); Experience co-creation (3); Experiential marketing (3); Value co-creation (3); Co-creation (2); Consumer Culture experience (2); Innovation (2); Knowledge transfer (1); ICTs (1); Stakeholder theory (1); Investment Creativity (1) Value theory (1)
Focus	C-CA (27) ; C-CO (18); C-CP (9) ; C-CC (5); C-C APO (4); C-CC (1)	C-CP (5); C-CA (5); C-CO (4); C-C (1)	C-CA (14); C-CP (11); C-CO (8); C-CC (3); C-C (3); C-C APO (1)	C-CO (10); C-CA (10); C-CC (4); C-CP (9); C-CP & C-C APO (2); C-CC (2)
Research methods	Survey (26); Case Study (10); Interview (4); Experiment (3); Content Analysis (2); Literature studies (1); Multi-method (1); Narrative (1); Interview and survey (1)	Survey (8); Multiple case study (2); Literature studies (2); Case Study (1); Content Analysis (1); Netnography (1); Narrative (1); Experiment (1)	Literature studies (13); Case study (5); Survey (5); Multiple Case Study (3); Survey (3); Experiment (2); Narrative (2); Content Analysis (2); Ethnography (1); Participatory research (1)	Survey (12); Interview (7); Case Study (8); Literature studies (2); Multiple case study (1); Experiment (1); Grounded theory (1); Customer-centric approach (1); Data mining (1); Observation (1)
Key authors	Kallmuenzer *et al*. (2019); Lei *et al*. (2019), Lin *et al*. (2017; 2018; 2019); Neuhofer *et al*. (2014), Navarro *et al*. (2014; 2015); Pera (2017); Park and Allen (2013); Schuckert *et al*. (2018); Smaliukiene *et al*. (2015); Zhang *et al*. (2015)	Cabiddu *et al*. (2013); Grissemann and Stokburger-Sauer (2012); Grezes *et al*. (2016); Prebensen *et al*. (2013); Shen *et al*. (2018); Sthapit (2018), Tseng and Chiang (2016), Tuan *et al*. (2019), Prebensen and Foss (2011), Wang *et al*. (2011), Weiler and Black (2015)	Benahmed and Elkaddouri (2017); Binkhorst and Den Dekker (2009); Buhalis an Foerste (2015); Buonincontri and Micera (2016); Campos *et al*. (2015); Melis *et al*. (2015); Neuhofer *et al*. (2012); Polese *et al*. (2018); Rihova *et al*. (2015); Sigala (2018); Trunfio and Della Lucia (2019); Wengel *et al*. (2019); Zhang *et al*. (2018)	Campos *et al*. (2016); Hsieh and Yuan (2011); Jung and Dieck (2017); Kim *et al*. (2018); Marques and Borba (2017); McCartney and Chen (2019); Mijnheer and Gamble (2019); Ngamsirijit (2014); Olsson (2012); Rihova *et al*. (2018); Ross and Saxena (2019); Xu *et al*. (2018); Zhang *et al*. (2019);

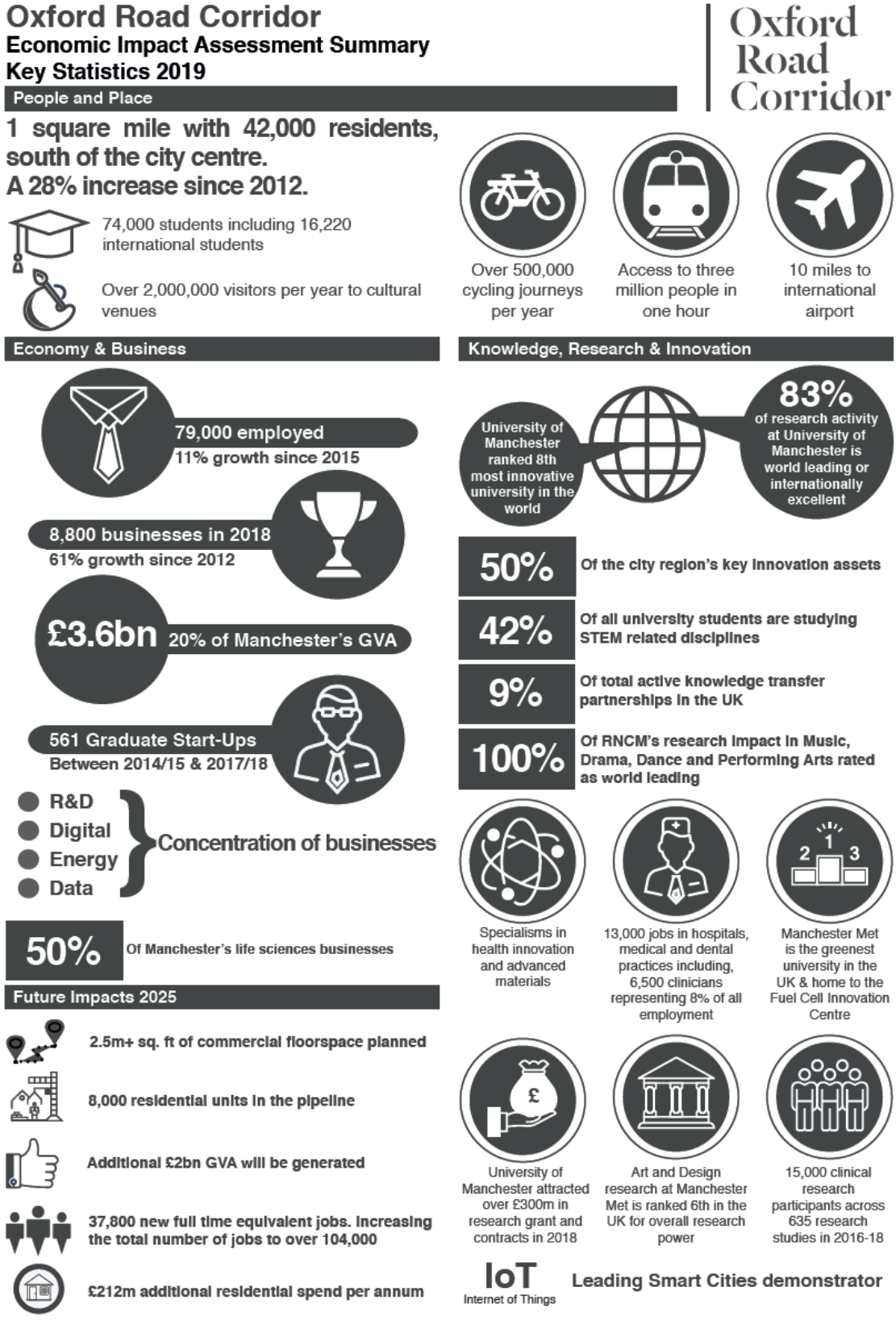
Note. Number of papers in brackets (except for Key authors). The Focus dimension acronyms refer to: Co-creation concept (C-C) for anything related to the concept; Co-creation process (C-CP) for encounters, interactions, mechanisms and management of the process; Co-creation output (C-CO) for the output and results of co-creation; Co-creation context (C-CC) for co-creation facilitators; Co-creation Antecedent (C-CA) for engagement, customer participation, operant and operand resources as prerequisite to co-creation; Co-creation antecedent, process and output (C-C APO) for all three elements of co-creation.

(Adapted from Mohammadi *et al*, 2020 pp. 315-320)

Appendix 2. The Oxford Road Corridor map

(Manchester City Council, n.d. Corridor Manchester Strategic Vision to 2025)

Appendix 3. Oxford Road Corridor: Economic Impact Assessment



Oxford Road Corridor, n.d.
https://oxfordroadcorridor.com/wp-content/uploads/2019/11/Fact-Sheet-V3.0.pdf

Appendix 4. Corridor strategy themes, objectives and spatial principles

Theme Economy	Objectives	Key spatial principles
1. **Supporting the Growth of World Class Institutions**	1. Providing a spatial framework which supports the growth plans of the institutional partners. 2. Integrating partners' institutional investment plans with the priority to make Corridor Manchester an exceptional place to study, visit, live and work, taking account of promoting east west links, access to the stations, and the points where estates join. 3. Making full use of other Corridor Manchester partner's expertise and resources to support institutional growth.	
2. **Accelerating Innovation, Commercialisation and Company Growth**	1. Developing commercial and academic applied research facilities and commercial accommodation which build on the Corridor Manchester's research strengths. 2. Providing incubation, grow on and high-quality premises for inward investors, spin outs, new starts and high growth companies, with the MSP campus set to triple in size over the next 10 years. 3. Stimulating an investment and support offer which takes account of the needs of new and existing technology business with the potential for rapid growth, particularly those developing and commercialising new products and processes, entering new markets and requiring investment and venture finance.	
3. **Championing Transformational Investment**	1. To develop and oversee major new development ventures, which contribute to the business objectives of partners, with the capacity to transform key locations within Corridor Manchester. • North Campus • Oxford Road Station environs • BBC site • Clusterlabs 2 and 3 2. To enable transport services to function within the area, enabling people to travel in a sustainable manner, including walking and cycling.	• To support the planned growth and future growth potential of its institutional partners • To increase the contribution of the private sector to Oxford Road Corridor's economy • To identify the future potential for underutilised land and buildings or low-quality existing developments to be redeveloped. • To adopt a land use strategy which supports the fact that Oxford Road Corridor is likely to, and should, deliver distinctive clusters of activity focused around its key assets. • To promote higher density development within key opportunity areas of Oxford Road Corridor (e.g. CityLab campuses) • Rationalisation or re-location of uses within Oxford Road Corridor should be encouraged to best support the Oxford Road Corridor Strategy • Ensuring future infrastructure investment is sufficient, and directed in such a manner as to best support and unlock development potential and growth

Corridor strategy themes, objectives and spatial principles (continued)

Themes Place	Objectives	Key Spatial principles
4. Creating a Special Place for People	1. To encourage a more diverse retail, food and drink, culture, leisure, sports and entertainment offer across Corridor Manchester, supporting stronger daytime and evening economies. 2. To enhance the public realm through well-planned and designed streetscape. 3. To connect and animate the space, forming intersections where people can meet formally and informally. 4. To provide a broader housing offer which takes account of the housing needs of the workforce of Corridor Manchester, and the attractiveness of Manchester as a place to live and work, in keeping with the Manchester Residential Growth Strategy.	• Oxford Road Corridor should take every opportunity possible to showcase the world-leading work and activities taking place, including through the design of new development. • Green infrastructure and street tree planting will continue to be encouraged throughout the Oxford Road Corridor Area. • New development and infrastructure projects should support the evolution of Oxford Road Corridor as a place where people make new friends and connections. • Anchor destinations, existing and proposed should be identified within the Oxford Road Corridor and the mix of cultural uses, cinema and theatre; coffee shops, restaurants and independent shops that they offer should be combined to provide places where people spend their leisure time as a complement to their daytime role of work and study.
5. Culture at the Heart of Corridor Manchester	1. To support the development of world class arts and cultural organisations and activities which enhance the reputation of Corridor Manchester and the city. 2. To place cultural venues, performances, and activities at the centre of a broader, leisure, sport, entertainment, and lifestyle offer, including optimising the spaces between cultural assets, connecting the public realm. 3. To use cultural assets, activities, and audiences to support small and medium sized businesses in food and drink, retail, and entertainment; as well as creative, artistic, heritage and performance industries.	• There is an opportunity to raise standards and provide a broader range of housing, which may comprise different operational models, to meet forecast demand • There is scope for further student accommodation; however, this should continue to be controlled in line with the City Council's Core Strategy Policy H12 and led by institutional partners with the wider city regeneration objectives in mind.
6. Developing Smart City Infrastructure and Services	1. To reduce the carbon footprint of Corridor Manchester through the more sustainable management of energy and waste. 2. To be leading-edge creators using information technologies and social media to have active engagement with work of institutions and companies, public services, and the daytime and evening economy for visitors and residents. 3. To integrate green and smart ideas into new development and investment proposals.	• Contribution to high quality re-design of the streetscape, squares and public spaces • Enhancing the quality of east-west crossing points and connections for cyclists and pedestrians is a key spatial priority • Cultural venues, performances and activities should be safeguarded and enhanced as part of a broader leisure, sport, entertainment, and lifestyle offer. • Transformational development opportunities should be used as opportunities to re-position and enhance the area's retail offer and act as growth pole's from which a wider and diversified offer can be established. • In the Oxford Road Corridor Area, thought should be given to developing an enhanced retail offer that matches the ambition of the area, creates distinctive areas and destinations within the area which encourages movement between places and positive interaction.

Corridor strategy themes, objectives and spatial principles (continued)

Themes People	Objectives	Key Spatial principles
7. Raising The Bar: Increasing Corridor Manchester's Contribution to Economic and Social Inclusion	1. To provide an annual apprenticeship programme for young people which provides training opportunities in the broad range of occupations within the Corridor Manchester workforce. 2. To use new capital investment to link young people and local residents to employment opportunities in the construction industry and its supply chain. 3. To increase the number of Manchester residents working within Corridor Manchester through the provision of employability and recruitment initiatives which overcome barriers to employment take up. 4. To connect to people, schools, and organisations in adjacent neighbourhoods, building on existing work to raise aspiration to HE and higher-level jobs within Corridor Manchester as a realistic ambition.	• People lie at the heart if the Oxford Road Corridor Strategy, not just as a pool of talent and knowledge, but as an opportunity to increase Oxford Road Corridor's contribution to economic and social inclusion. It is essential that new development (physically as well as functionally) must not turn its back on local communities, but foster improved connectivity with adjoining areas to ensure that the benefits of investment and regeneration flow into those areas, for example as has been achieved at Birley Fields, Manchester Met and in employment initiatives managed by MCC, UoM and MFT. • New capital investment should be used to link young people and local residents to employment opportunities in the construction industry and its supply chain, as well as through a continuation and strengthening of employability and recruitment initiatives already in place through the Oxford Road Corridor's partners.

(Manchester City Council, n.d.; Deloitte, 2018)

Appendix 5. Manchester smart city policies, document and initiatives (2003-2016)

Key Strategic Policies and Documents	Publication and Launch Dates	Key actors	Key Initiatives (year)	Key themes/issues
Digital Development Agency	2003-2015	City Council	Manchester Living Lab (2006) Corridor Manchester Partnership (2007) Manchester Digital Laboratory (MadLab) (2009 or earlier) Data GM (2011) Dimmer (2013) MiGuide (2013) Greater Manchester Data Synchronisation Programme (2013) Central Library Digital Demonstrator (2014) Intelligent Lightning (2015) Triangulum (2015) CityVerve (2016)	
Digital Strategy	2008	Coordinated by Manchester Digital Development Agency (part of the City Council)		*Governance* (e-citizenship); *Economy* (City digital competitiveness); *Digital Infrastructure*; *Environment* (Greener city)
Digital Manchester	2012	Manchester City Council (presumably involved, Manchester Digital Development Agency). City of Digital Enterprise strategy, with *focus on promotion of Oxford Road Corridor.*		Connected Citizens; Connected Businesses; Connected Manchester; Digital Skills; Social City; Digital Reform; Economic Growth; Digital Place; Investment; Digital Leadership
Feasibility Study	2012	Core steering group: City Council, University of Manchester, MMU, and TfGM. Input from Corridor Partnership, Manchester Science Park, and Arup – via New Economy (a policy & strategy advisory board to the Greater Manchester area). *Focus on Oxford Road Corridor*		Enhanced low carbon mobility; Clean energy generation and distribution, Efficient buildings, Integrated logistics; Resource management; Community and Citizen engagement
Smarter City Programme	2016	- Manchester City Council sets out series of key themes, then a selection of case studies from Manchester – the council itself has had varying degrees of involvement in these (in some cases, no evidence of any)		Smart Projects/Initiatives must contribute to all 6 themes: *Live* (social sustainability); *Work* (new skills, social innovators); *Play* (Culture, Environment, Tourism); *Move* (Mobility, Transport); *Learn* (Education); *Organise* (Citizen engagement, Open Government)

(Adapted from Cowley *et al*, 2018)

Appendix 6. Main Manchester smart city projects 2015 – 2020

	Greater Manchester Data Synchronisation Programme	Triangulum	CityVerve	SmartImpact	Synchronicity
Definition	Open data programme to create environment for the free flow of public data	A project transforming the Corridor area of Manchester into a smart city district. Manchester la	Smart city demonstrator developing new services using the internet of things.	Network of cities, sharing best practice and developing tools to enable smart city district. Manchester City Council leads the project	EU Horizon 2020 funded project to develop data driven IoT solutions in EU/UK smart cities
Duration	2013	2015 – 2020	2016 - 2018	2016-2018	2018-2019
Partners/ Collaborators	FutureEverything, Manchester, Trafford and Salford City Councils, Future Cities Catapult	Manchester City Council, MMU, University of Manchester, Siemens, Clicks+Links	Consortium. 21 organisations including BT, Siemens, Cisco, Clicks+Links, FutureEverything, TfGM, University of Manchester, MMU, Digital Catapult and Future Cities Catapult	Dublin, Porto, Zagreb, Guadalajara, Smolyan, Suceava, Miskolc, Stockholm, Eindhoven	15 Partners, including Manchester City Council, See.Sense, Digital Catapult, MMU, Everimpact
Programme projects	Code Fellows (civic-minded developers' recruitment)	Smart city open data platform (MCRi); Smart Energy grid; Smart transportation	Culture & Public realm; Energy & Environment; Health & Social Care; Travel & Transport	Governance, Integrated urban development (financial barriers and risks)	Transport, Energy, Environment, Health and Social Care
Location	Greater Manchester and city councils (including Corridor)	Oxford Road Corridor	Oxford Road Corridor	Manchester	Oxford Road Corridor
Smart technologies adopted	Linked data storage and coding technologies	Internet of Things, Data storage and management	Internet of Things, beacons, mobile app	N/A	Sensors, IoT, Smart Data platforms and solutions
Outcome for	Public and Social stakeholders	Local stakeholders and other smart cities	Residents and Tourists	Local stakeholders and Partners of the Project	Residents, SME, public and private firms

Appendix 7. Information sheet

Research Project Title:

Value creation in smart destinations. The case of Manchester.

Dear Participant,

You are invited to take part in this research project that aims to analyse the value creation and service innovation processes in smart tourism destinations and it is being conducted as part of a PhD degree within the Marketing, Retail and Tourism (MRT) department of the Manchester Metropolitan University.

Please, take time to read the following information carefully and ask questions if anything you read is not clear or would like more information.

This study implies that value is co-created with customers/tourists and adopts the supply-side perspective. In particular, I am focusing on data, information, collective knowledge-based practices and the use of smart technology.

I am interviewing data and information managers as well as marketing managers to expand our understanding about the integration of data and knowledge to enhance services and co-create value in Manchester. Your participation could result in valuable managerial insights for destination stakeholders to enhance services and create value for the benefit of tourists and residents.

Participation involves a 20–30 minutes, one-to-one, semi-structured and open-ended interview in which you will be encouraged to share your opinions and experiences relevant to the aim of the research. The interview will be audio-recorded, for later analysis, under strict ethical standards that will be kept for the entire duration of the project. The digitally recorded interview data and any material provided will be treated confidentially and anonymised in a way that does not identify individuals. According to the Manchester Metropolitan University ethical regulations, data collected will be securely stored and not shared with anyone not directly involved with the research.

Your participation is voluntary (of your free will) and unpaid. The curator of the research and the interviewee are free to withdraw at any time, without giving any reason in writing, email or telephone. Any personal and contact information provided will be destroyed at the end of the project. At any point after the interview, you can request to have your details destroyed.

Thank you in advance for your help with this research. If you like to know more about it, feel free to contact me or my supervisors at the Manchester Metropolitan University.

Appendix 8. Consent form

Manchester Metropolitan University

Title of Project: Value creation in smart tourism destinations. The case of Manchester.

Name of Researcher: Lino Trinchini

Participant Identification Code for this project:

Please initial box

1. I confirm that I have read and understood the information sheet for the above project and have had the opportunity to ask questions about the interview procedure. ☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason to the named researcher. ☐
3. I understand that my responses will be sound recorded and used for analysis for this research project and I free to refuse to answer any questions. ☐
4. I give permission for my interview recording to be archived as part of this research project ☐
5. I understand that excerpts from the interview may be made part of the final research report, which will be accessible to public, and that my responses will remain anonymous. ☐
6. I agree to take part in the above research project. ☐
7. I understand that at my request a transcript of my interview can be made available to me. ☐

I have read and understand my rights and consent to participate in the project

_____	_____	_____
Name of Participant	Date	Signature
_____	_____	_____
Researcher	Date	Signature

To be signed and dated in presence of the participant

Appendix 9. Interview guides (Data and information managers)

Date/ Time: Place:

Interview No: Interview duration: Interview code (D1, D2 …):

Thanking for participation, information sheet reading and informed consent form signature

Start recording

Introduction:

I am interested in value creation within smart tourism destinations. Thus, I will be asking you questions about how data/information, smart technology, rules and norms affect the co-creation of value, service innovation and competitiveness of Manchester.

Interviewees' personal details for background information (all anonymised)

Names:
Email:
Job title:
Position / Role (e.g. operational; strategic):
Years of experience in the same role /position:
Educational background:
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1. Data/information-based resources and challenges

Could you tell me a little about data collection and exchange processes in your company?

What kind of data/information your company rely the most (internal vs external)? What is your opinion about open data and big data?

With reference to data/information resources, what sort of challenges/issues your organisation faces the most? How this challenges/issues could be managed to serve customers and residents better?

What actions, processes and practices you/your firm follow in case of missing data or in extreme abundance of data/information?

Would you consider data as 'raw material'?

2. The role and use of smart technology (as operand resource)

How technology support/facilitate the collection/processing/exchange of such "raw material"? and in respect of external data resources (from customers and other actors) ?

In your opinion, what is the best use of smart technology to enhance data collection/processing and exchange?

3. Knowledge and skills

How data/information expertise (know-how) enhance tourists and residents use of your services?

Are there any other data/information-based expertise equally important?

(What kind of uncertainties do you face when dealing with data?)

(How do you face the lack of data?)

How you/your organisation face any data/information-related lack of expertise?

4. Institutions and Institutional arrangements

To what extent rules, norms and practices affect your data/information management?

Are these rules, norms and practices shared with other organisations and people you collaborate with (incl. residents and tourists)?

In the distinction between explicit and implicit/informal (tacit) shared rules, which one affect the most of your data/information collection, processing and exchange? in what ways?

Could you provide an example of how they affect your use of technology, value proposition and customer consumption of your services?

5. Smart tourism destination and value co-creation

In your opinion, how value for tourists and residents can be co-created in Manchester?

Appendix 10. Interview guide (Marketing/knowledge managers)

Date/ Time: Place:

Interview no: Interview duration: Interview code (e.g. K1, K2…):

Thanking for participation, information sheet reading and informed consent form signature

Start recording

Introduction:

I am interested in value creation within smart destinations. I will be asking you questions concerning collective know-how, service innovation and smart technology in your organisation and across actors in Manchester affecting the co-creation of value.

Interviewees' personal details for background information (all anonymised)

Names:
Email:
Job title:
Position / Role (for instance: operational; strategic):
Years of experience in the same role /position:
Educational background:

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1. Smart (tourism) service ecosystem context

How is your company positioned in the Manchester business ecosystem? In what ways this context affects your organisation (if applicable, value proposition and your services)?

Is your organisation an active member of local/regional professional or public-private networks?

How your organisation makes best use of this networks?

2. Collective knowledge (know-how and skills)

Could you please tell me what sorts of practices/actions in your organisations involve external actors (tourists, communities, residents, or organisations)? Do this practices/actions include exchange of know-how? (*Collaborative competences*)

Could you please tell me a little more about the interactions and engagement with organisations, residents and/or tourists using your services?

(*Absorptive skills*) How is collective expertise and know-how transformed into service innovations or better ways to serve communities/tourists/residents/organisations? Any example?

(*Adaptive skills*) How does your company adjust internal processes and decision making to external changes? Are these adjustments guided by the use of external resources, such as your networks of relationships or engagement with communities/residents/tourists? Any example?

3. Smart technology and service innovation

To what extent do you use (smart) technology to support your services and their use? What kind of consumer's needs does your company fulfil by using (smart) technology?

Could you describe any innovation in services recently provided by your company? Do you think that such services could be improved further through collective exchange of expertise? How? Any suggestion?

How (smart) technology facilitates or restrains your decision making and data or collective expertise to enhance your innovative services and value for organisations-communities-residents-visitors?

4. Resource integration

How internal and external resources are rebundled to benefit tourists/residents and other actors in Manchester? Which resources (internal or external) do you consider as crucial to create value for organisations/residents/visitors/communities? Why?

In your opinion, how is shared expertise and skills used across organisations in Manchester?

5. Asymmetry and uncertainty

From your perspective, what happens when significant data/information to enhance and/or innovate services are missing? How about lack of know-how? Any example?

What kind of uncertainties your organisation faces the most?

In uncertain situations, does your company take a managerial (predictive analysis) or entrepreneurial (based on creativity and experience)?

6. Institutions and institutional arrangements

What kind of shared norms, rules and/or practices support/restrain the production and consumption of your services in Manchester? How such norms, rules and/or practices affect know-how and skills exchanges between your organisation and other organisations-communities-residents-visitors? Any example?

Would you say that formal practices are more common than informal ones to manage changes your company has no control over (e.g. market changes, consumer behaviour)?

Are local norms and rules, formal and informal, more influential than national and international ones?

7. Smart destinations and value co-creation

In your opinion, how value for tourists and residents can be co-created in Manchester?

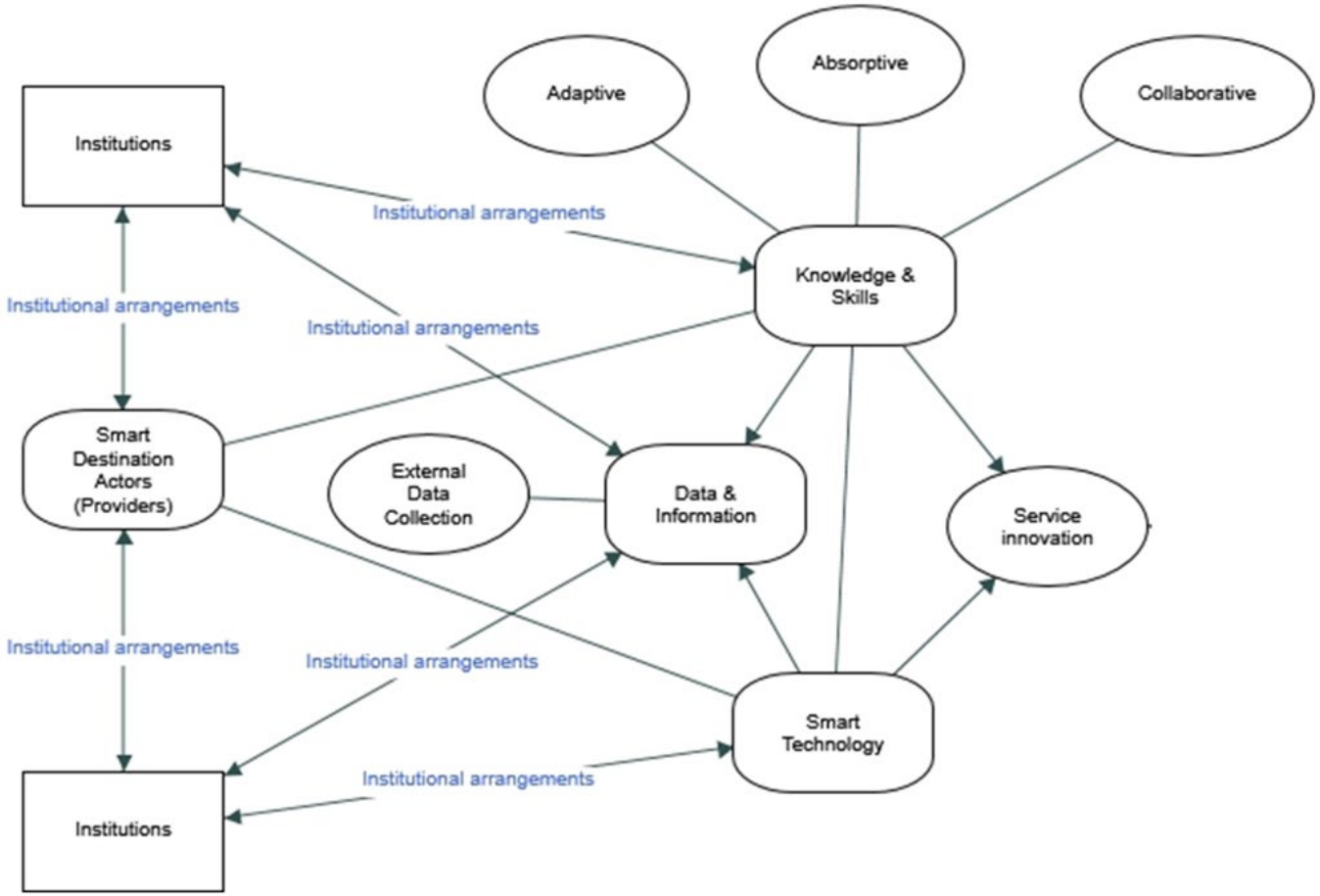
Appendix 11. Theory-driven main categories

Index	Label	Definition	Description	Literature references
T1	Data and information sharing	The collection and external exchange of data and information, as raw material, among actors of the smart tourism destination	The sharing activities of large amount of data (Big data), from smart technology, to nurture open innovation (Open data) and facilitate value co-creation. This relates to the notion of smart tourism ecosystems characterised by open data and big data	Alavi and Tiwana (2003); Chiu *et al* (2009); Wang *et al* (2013); Kitchin (2014a); Buhalis and Foerste, (2015); Lamsfus *et al*, (2015); Boes *et al* (2015); Gretzel *et al* (2015b); Baggio (2016).
T2	Collective knowledge in value creation processes	The use of knowledge-based practices and activities are essential to service exchanges and value creation among actors of the smart tourism destination	Adaptive, absorptive, and collaborative competences, skills, and capabilities collectively shared and socially constructed. Competitive advantage is mainly created through such knowledge. This pertains to the collective knowledge and skills (operant resources) integrated by actors involved in value creation processes within the smart tourism destination	Brown and Duguid (2001); Vargo and Lusch (2004); Inkpen and Tsang (2005); Ballantyne and Varey (2006); Lusch *et al* (2007); Maglio and Spohrer (2008); Spender (2007; 2008); Edvardsson *et al* (2011); Edvardsson and Tronvoll (2011)
T3	Asymmetry and uncertainty	Disparity and lack or excess of information, data, and knowledge within the smart tourism ecosystem	Difference in accessing data, information, and knowledge by actors (asymmetry) as well as absence such resources affecting actors' decision making (uncertainty). Uncertainty and asymmetry are attributes of the complex contest of smart tourism destinations. Value creation, service innovation and competitive advantage depend on facing resources scarcity by harnessing collective and shared data information and knowledge.	Peñaloza and Venkatesh (2006); Woodruff and Flint (2006); Spender (2007; 2008); Read *et al* (2009); Lusch *et al* (2010); Edvardsson *et al* (2011); Read and Sarasvathy (2012); Lusch and Vargo (2014a); Rossi *et al* (2015)

Theory-driven main categories (continue)

Index	Label	Definition	Description	Literature references
T4	Smart technology duality	Smart technology role as operand and operant resource in the creation of value in smart tourism service ecosystems	(Smart) Technology is recognised as a medium (operant resource) and an outcome of human action (operand resource). Technology is a combination of practices, processes and symbols enabling value creation and service innovation, rather than just being instrumental. The way actors use and integrate technology with other resources (data/information, knowledge, and institutions) is relevant to the creation of value and service innovation for competitive advantage.	Orlikowsky (1992); Lusch *et al* (2010); Ordanini and Parasuraman (2011); Akaka and Vargo (2014); Lusch and Nambisan (2015)
T5	Resourcing and collaboration	The transformation of resources and their integration in services exchanges for value creation requires collaboration and relationships across all actors involved.	Actors need to collaborate to exchange, integrate and develop resources (data/information, technology and/or competences) Resourcing activities mainly require operant resources (collective knowledge and skills), alongside operand resources. This refers creating and integrating resources as well as removing resistances (physical and intangible).	Lusch *et al* (2007; 2008); Vargo *et al* (2010); Mele and Della Corte (2013); Lusch and Vargo (2014b)
T6	Institutions and institutional arrangements	Endogenously generated institutions and institutional arrangements (interdependent assemblages of institutions) as the foundational facilitators of value creation	Institutions are a set of guidelines (laws, social norms, conventions, symbolic meanings, beliefs, routines for communication) that frame interactions and regulate exchange during the value creation process. Actor-generated institutions (rules, norms, meanings, symbols, practices, and similar aides to collaboration) and institutional arrangements influence the way in which technologies, data/information and knowledge are used	Vargo and Lusch (2004; 2016); Edvardsson *et al* (2011); Vargo and Akaka (2012); Vargo *et al* (2015); Barile *et al* (2017)
T7	Service innovation	The way of enhancing services (innovation) to achieve competitive advantage	Value creation as well as the application and integration of resources within the smart tourism ecosystem drive service innovation. This relates to the rebundling of resources, mainly technology and competences, to serve better and gain competitive advantage	Lusch *et al* (2007); Spohrer and Maglio, (2008); Ordanini and Parasuraman (2011); Akaka and Vargo (2014); Lusch and Nambisan (2015); Randhawa, and Scerri. (2015); Skålén *et al* (2015)

Appendix 12. Theory-driven conceptual map



Appendix 13. Initial manual coding (example)

Interview transcript

Date/Time: 23/03/2018 9:30
Place: Whitworth Cafe
Interview sequence no: 1
Interview duration: 32' approx.
Interview code: D1

Data Item	Initial Codes
Q. Would you consider the data as raw material to be acted upon? Oh yeah, very much…I guess you are interested in to define what data I work with, so ehm for me and my role it's always information about audiences…so the number of people we engage and very much the diversity of people we engage, and then information about their behaviour, *why they come here, how they come here and the impact in their engaging with the cultural institution has on their life, on their well-being, on their health on their social cultural (*person). Very much, I would say half of my job, is about collecting that information in a robust and reliable way, so it's accurate, truthful. The other half of my job is communicating that to the leadership team within the organisation, to people throughout the organisations so they can use that to inform their work…ehm… and that's so…I like to think about the research I do as…having the potential to stimulate new creative thinking, their creative work and the strategic thinking, so it's very important that work, that data come actioned…so, to me, it is an actionable thing. So, for me, very much so.	• Information about audiences • Number of people engaged • Diverse people engagement • Behavioural data (why, how and impact on life/well-being/health/socio-cultural) • Robust and reliable data/info collection • Accurate/Truthful data/info • Communication to leadership team/colleagues • Actionable data/info
Q. The data you rely on is more external data, rather than internal? I guess it depends…Most of the information we generate ourselves, so it's from doing our own research and data collection, from doing a lot of sample surveys of our visitors, from having…we have electronic monitors on the doors so we know how many people are coming in through the building. So, it's more internal information, but we also use national statistics data… hem, I've recently being trying to access *footfall data* for the city and failing in that…so there is a mix of data about our communities and the public that surround us and information that we generate ourselves. **Q. So, it's a mix of the two** Yeah, yeah… **Q. So you cannot say like 50/50 or 60/40** I think it's a mix of the two and it's important to link the things together, so, for example, we monitor the ethnicity of our audiences, because we want to know how inclusive we are and I will connect that information to data of the ethnicity of the community that surrounds us, so that we know…we know our audience is disproportionately white compared to the ethnicity that surrounds us, that's not ok so we're working to change that, so it's linking different mix of data together.	• Internal data collection • More internal information • Visitors survey • Electronic monitors at the doors • External data • National statistics • City footfall data (failing in access) • Mix of data • Local communities/public data • Internal data/info • Internal/external data mix • Data/info linking importance • Audiences ethnicity monitoring to know inclusiveness and impact on communities. • White disproportion compared to local communities' data • Linking different mix of data together

Q. You know what big data are, would you consider them a challenge or an opportunity? Hem, I guess there's…there is a big data project for... hem, the cultural sector that we are part of, we contribute information to, called the Audience Finder... if you're familiar with that, yeah…I guess there is great potential in that programme, but I don't think we've been able to realise many benefits from it, so I think there is more…I definitely see the value of it and the potential of it, but having been able to access that data in the way that I can use it, the way I can apply it to our strategic interests that's quite difficult, in my experience.	• Big data project participation • Cultural sector data • Audience Finder • Great potential in that project • Limitations in using big data
Q. And, erm...**what about the open data?** Because I know that in Manchester there was… still there is an open data project, which means government, official statistics or these kind of things… Yeah…yeah, there's a mapping Manchester, mapping GM, so there's …we use that information, yeah definitely, particularly around…there an index of multiple deprivation, I'm sure you're familiar with that…we use that work... that a lot, so we connect the postcode data with connection visitors with data on deprivation to look at estimates how fairly we serve different parts of the community. **Q. So, you use more open data than the big data**… Yeah yeah, because it's... I guess it's open I can get at it (laughs), I can use it …	• Mapping Manchester • Mapping Greater Manchester • Open data usage • Index of multiple deprivation • Open data and internal data linking • Open data/internal data mix to serve community better • More use of open data than big data because they are free to access

Q. What are the challenges, issues, that the Whitworth faces the most when you dealing with data and information? Oh, the challenges…do you mean specifically around our collection of data? **Q. Yeah, across the collection, exchange and processing** OK, erm...so to start with collection…I guess the challenges, I think the challeng…my my post was recently created, before I started there was no data manager and I think that's the response to a challenge that there's a specific …collecting data is in a way to tell a truthful and accurate picture is a specific skill, it's a particular set of competencies other members of the galleries not necessarily have, so my post was created as a response to the organisation feeling that data is hugely important but it couldn't really connect effectively with it. So a post specifically created to provide the capacity and the skills needed within the organisation to help people work with data, so I think that's a really big thing for cultural organisations. I think peers in the city that don't have an equivalent job, I have the only job of this kind, to my knowledge, outside of London, struggle quite a bit with having the time to collect data well and to interpret it once they've got it. So, I think we make very good use of the information and I guess from the…I'd like to see with our…how we might publish our research and share our data more openly with other institutions so that more	• Data manager role • Data manager skills in collecting reliable data • No similar job in Manchester • Lack of similar skills outside London • Good use of information • Publishing and sharing data – collective sharing • Willingness in sharing data • Open data projects not open as they should be • Not open as expected • Closed paywall

academics could use it. I think organisations, when they collect data should be completely transparent and open it up for other purposes, so there's other information I might hold that could be hugely important for someone to do something I've got no idea about, so it's like that kind of open source, but I think the reality...I think my experience in some open data projects is that they're not that open as making things genuinely accessible, so, for example, the Audience Finder is all behind a paywall and it's close and I find that… just as a missed opportunity, really. So, I think the challenges really…erm, accessing data in a kind of raw form that can be analysed by the researchers and joined to oter dataset in a meaningful way.	• Accessing/translating data in different raw forms is a challenge

Q. And…erm, what kind of actions, processes or practises you follow in case of missing data, for example, if you need...like you need some kind of data and you missing the data…what kind of ... What do I do? (laughs) **Q. (I laugh) …yeah, or in case you have too much data and don't know how to deal with that** Mmmmh.. If I have too much data, I don't think I ever had too much data (she laughs)…erm, and if I don't have something, I guess I'd been pragmatic, I would try…I would speak to whoever I think of, whoever I can connect with to ask the question about whether I can access something and If I can't get it pragmatically I'd move on do something else, so… **Q. Internally or externally?** It would always be external, within our data collection processes, we can usually collect what we need because we have the capacity to do it. **Q. So you don't rely…on external...** No, no…we do all in-house for that kind of stuff	• Data are never enough • Pragmatic • Ask someone • Move on if can't get help • External approach • Capacity to collect what needed • In-house/Internal data to collect data

Q. Erm, do you use technology? what kind of technology, like smart technology, in your….to support this, the data collection, exchange and processing we are talking about Yeah, ok…so in terms of collection, I guess we have visitors number are collected electronically, so there's a bit of cameras that connect that, we do our survey data on iPads…so we have that, we don't, mmh…I mean, we probably not as good as we can be on such digital collection, because an element of engagement with the gallery happens online, it doesn't happen physically, so, we have some monitoring of how social media interactions and websites hits and that kind of things…There's probably, I kind don't know what the opportunities are, in the sense what smart technology might add to it…I'm kind of really open to it and find out more about that… **Q. So, what is your opinion about smart technology affecting service innovation, for example** What do you mean by smart technology? **Q. Sensors, smartphones…** Ok **Q. This kind of technologies** Yeah… **Q. You mentioned iPad** Yeah, I guess is…I mean it's...I mean, I think we use it partly because it saves, it's labour saving thing, so if weren't doing our surveys on iPad, we will be doing it on paper and someone will have to fill it, do all the data entry, so it's a kind of use in a pragmatic, practical way. I know some museums have done things around like tracking movement through the gallery, like how many galler…you know, is this exhibition busier than other exhibition, how the people move through their space by using iPhones. But, I'm not sure how successful that's been, I guess, my concerns are around accuracy, and then also, it's linked to our strategic interests, so how it supports what we want to do. Erm, probably it's not regular answer to the question… **Q. No, no, no…there is no good or bad answer…[she laughs] it's just that I'm interested in your opinion about the use of technology, smart technology or advanced technology when you're dealing with the data, when you're collecting the data, exchanging and processing…so there is no good or bad** Yeah, yeah…I think in terms of exchanging, there was…like I know CityVerve, on the website where you can upload datasets and people can create apps, that kind of thing, I think…yeah…I think there's great potential for that…but it's such an open question, you can do anything... how can you can boil that down and…	• Data collected electronically • Camera • iPads for survey data • Online engagement • Social media (monitoring interactions) • Websites hits • Open to smart technology • Labour saving • iPads use • Pragmatic • Practical use for data collection • Doubts (Uncertainty) about smart tech usefulness linked to strategic interest • Primary concern over accuracy • Exchanging data • CityVerve • Dataset uploads • Great potential within uncertainty

Q. And, do you consider the data information collection, exchange and analysis expertise, the know-how, important to better serve the tourists, residents when visiting the gallery? Oh yeah, definitely, I think there's a, I think, good potential…I'm thinking about how organisations within a particular area or within the city work effectively together, so I think that the ideas is understanding how people	• Good potential for effective collaboration • Sharing information for collective purposes

move through the city and use the city and been able to share that information for collective purposes is really important, so I would say is important for the gallery, it's important for the organisation in the context of its border, the border of cultural infrastructure, erm… potentially we have done a lot of work in the park, festivals and music festivals and big outdoors space events, so erm…there could be potential for understanding the relationship between the outdoors and the indoors and how that…our media locality in the environment is really important, so there's potential there in how we understand engagement with park engagement with the gallery and the interchange between the two things	• People movements through the city • People's use of the city • Cultural infrastructures • Context data (Park, Gallery) • Indoor-outdoor events • outdoor-indoor relationship • Own media locality in the environment • Interchange between outdoor-indoor engagement • Knowing how to connect the different types of data and information

Q. Mmh…yeah, yeah, definitely…how about the lack you were supposed to… Sorry [laughs]…sorry, I certainly forgot you last question… **Q. There is any other data and information expertise equally important to you, in addition to the ones you …if you can think of others** So different types of expertise around data and information…I mean, I think we could benefit as a gallery from erm expertise centred more specifically on smart technology and those kind of issues, erm 'cause I'm a kind of social researcher, so it's not necessarily my, my my area, but I'm very interested in it. Yeah, I think it's that link between the potential of a smart city and the potential of smart technology and the strategic interest of the city, and the city region and the institutions, so it's gonna connecting all these dots, I think that's the expertise... perhaps what is missing at the moment that we could develop on. **Q. In case of lack of expertise, for example… how your organisation faces this lack of expertise** Erm… **Q. Data and inform…We're talking about data and information know-how, let's say** Yeah…I don't think there's a lack of expertise. Well, erm…do you mean in my organisation or in the sector, the art sector? **Q. No, no…in your organisation, in your job, for example, you**… Yeah, what we do…I don't know, I guess it's about…I think is about the value of the network and collect connecting those things…I'm aware of this smart city project, I'm aware of some of those things, so I'm not sure is a lack of it, well...I think it's about connecting me and others in the galleries with those broader conversations may be better, so kind of leverage some …some actions	• Different expertise around data and information • Lack of smart technology expertise • Connecting the dots expertise • No lack of expertise • Value of the network • Collect and connect things • Smart city project • Connecting with others • Broader conversation • Leverage actions

Q. Mmh, talking about institutions and institutional arrangements in terms of…erm…let's say norms, rules, are there any explicit or implicit norms, rules, practices in your job? Mmh… **Q…that your organisation follows** I'm not sure I understand the question **Q. Ok, it's like your organisation…I guess complies with some general norms, rules and practices, boiling it down to your job, are there any rules, norms, and practices specific to the data collection and information processing, that you have to comply or you…that are explicit or like…** Yeah…I guess, do you mean like kind of principles we work to **Q. Yeah, like any you know any unspoken norm, rules …like it's not in the code of practice, but** … … and we tend to do it this way **Q. Yes** Yeah, I don't know…with data, data is very codified area of work in the sense, I thnk there are… so what came to mind is we got principles around having very high professional standards in the work we do in terms of accuracy, so, for example, I wouldn't share a piece of information I was not confident it was fairly… has a fair level of accuracy to it…we've got a commitment to be open in terms of transparent with our way of working and I think there's more than we can do around publishing the data that we have…What else I can say, and then we got…there's explicit rules around data protection and GDPR that we need to comply to…I suppose the unspoken rules are around…maybe there's a tension I would say between data or perception of data and how cultural organisations work in terms of the primacy of creativity hands… open-ended thinking and a general openness in terms of the possibilities of different directions that people could going, so there could be maybe a negative perception of quantitative research within culture within art galleries because they perceive a disconnect or a dissonance between their values and the values of data practice. So, one of the things I've been doing is trying to break that down so to open people up more to the value of that and that's a bit more around the social responsibility agenda, that's what connects the two things, the values of the galleries and data, what data brings.	• (Data) Codified area of work • Principles and very high professional standards for accuracy • Sharing accurate information • open (transparent) work culture • Willingness to share more (than publish) • Data protection • GDPR • Explicit rules • Unspoken rules • Data/perception of data vs Creativity in cultural organisations • Data vs open-ended thinking • General openness vs data • Negative perception of quantitative research within cultural organisations • Perceived disconnection / dissonance against data practice • Social responsibility agenda • Open people up to the value of data • Connecting art galleries value and data value (what it brings)

Q. And this, for example, affect the use of technology and the <u>use of data</u>… No, I don't think so directly…It's funny when you say 'the use of technology', it tricks me up, because I would think about… technology as a means to an end, it's not the first thing I would think about. The first thing I would think about is the strategic objectives of the gallery or what we need, where we need to get to, what data do we need to help that story and then technology is further down the list in terms of the method. So it's like strategic aim, researching, methodology and technical solutions…it kind of goes in that order in my mind, so I wouldn't necessarily…technology is not the first thing that comes in my mind…maybe is an issue, maybe that's a problem because I'm not considering or maybe I'm missing some of the potential because it's further down the line. **Q. Yeah, and…erm, what is your knowledge about smart city, would you think of Manchester as a smart city for tourists?** Erm. I'm aware of the CityVerve project, but primarily through the press coverage that happened last year and a colleague of mine, who might be useful to you to speak to him, he is [omitted], I know he has some connection with the smart city projects and he's been talking about it so, I wouldn't say I'm hugely…	• Technology as a means to an end • Technology not the first thought • Primacy of strategic objectives • strategic aim, researching, methodology and technical solutions • CityVerve project

Q. Yeah, ok…but you know ehat a smart city is…have you heard about… Yeah, I know the principles of it…and I'm trying to connect with that a little bit, because one of the things I wanted to find out, we have some public art ..and one of the things I wanted to know is how many people engage with that public art, so how many people move through the park, we have public art on oxford road as well…how many people connect with that, 'cause that information is really important for our funders, it demonstrates the impact and reach…so, I was kind of looking at the CityVerve website trying to…Could I..Is there any footfall data is there anything I could use, my conclusion was no [she laughs] so I got to stop… so I kind of did pursue that…so that's been my specific interaction. **Q. Have you ever heard the term smart tourism destinations?** No, what's that? **Q. Erm, that's the application of smart city to tourist destinations, the same concept of smart city applies to destinations, consider both the residents and the tourists in terms of several dimensions, which is the actual extend the smart city applications to the tourism industry, so art galleries…any tourist stakeholder of the tourist destination. That is the smart tourism destination…** **And in your opinion how value for tourists and residents can be co-created in Manchester?** Value co-created…for tourists… **Q. Yes, you provide the service, the service has a value when… the service are used, for example by visitors and residents…how do you think can value be co-created in Manchester…I mean, considering the whole city context.**	• People engagement with art in and outside the gallery • Public/Visitors flow in the park • Oxford Road • Lack of footfall data in CityVerve project

So, do do you mean in terms of …like increasing the number of people **Q. Just your opinion about the co-creation of value with…I mean, service offering, residents and tourists, how can this be like… enhanced or…from your perspective, of course.** I'm bit struggling…so do you mean co-creation in terms of co-design, like people coming together…to inform…so	• Co-design • People coming together
Q. You have like, the city, the network of service providers, tourist service providers, and you have lots of tourists and residents they use each service…so, in your opinion, from your perspective as data manager, how can this be enhanced to innovate services to increase the value for visitors… And so, value…so by value we mean in terms the kind of quality of the experience they have, the economic impact of their.. **Q. Yeah, yeah, …the satisfaction…this kind of things**… Yeah, ok...because value isn't an easy word… **Q. Yeah, it's a big word** How can it be done…I'm thinking around…so, if you're thinking about… **Q. From the data manager perspective, of course…** If you were thinking about value in terms of economic impact… if we providing a better service in terms of the tourist industry, with perhaps with sign posting…if we're making this a more attractive destination that encourages more tourists, particularly international tourists, that has a greater economic impact on Manchester… if cultural organisations are able to, erm… guess, provide better…to communicate better the package of what there is in Manchester to engage with in terms of culture, but also restaurants and the broader tourist economic, if we can bring that together, to provide a more cohesive package, then that increases the attractiveness of Manchester, so there's a kind of something in there. But then, there's also …we think a lot about well-being, how people feel within their space, and that's very important for residents, that is also very important for tourists, we know tourists come here often, adults on city breaks, we have a lot of families, so maybe there's ways of…I guess, enhancing the experience in terms of well-being or in terms of…their enjoyment...but how that links to…I guess about taking the stress, or some of their thinking how to travel around the city, how to understand different…how the city works, I don't know…It's a tough question now… **Q. Yeah…but, we don't need to answer not… an exhaustive answer is not…** Interesting, yeah...I guess it's a kind of concrete, what the concrete applications are…for tourists…mmh **Q. And data can help…the use of data collection, exchange, processing** I think so… **Q. That is why your perspective is…relevant to this** Sure sure, I think in terms…I guess…we have fairly limited…so, we understand in terms of our international…we know where people come from in terms of whether they come from for domestic tourists, we know where, the countries they come from, but we don't really have a way of linking that	• Value as quality of experience • Value as economic impact • Value is difficult • Providing a better service • Sign posting • Making destination attractive for tourists • Economic impact on Manchester • Improve the communication of cultural attractions • Bring tourist products/services together • Cohesive package • Well-being • People feeling within Manchester • Enhancing tourists and residents' well-being experiences • Tourists/residents enjoyment • Taking the stress out • Ways of transportation • Understand how the city works • Limited understanding of visitors' insights

information with other people, so we don't if we are similar or different to other organisations, and a greater exchange of information around what the tourist market is in Manchester, more information about why people come or what their experience is like here, what parts of the city they might concentrate on. I think more, yeah…I think of just a greater, more, new understanding of the tourist market and that's what could be leverage by a data project that would be useful in informing strategy around how we communicate internationally… **Q. That is why I was asking about the data and information related to the lack of expertise…this kind of expertise** Yeah, yeah…I guess this all misses marketing, maybe I'm the wrong person for you to speak to … **Q. No, no you're the right person to speak about this…** Oh yeah, yeah…is interesting, is it…I mean, I guess…I'm kind off slightly struggling, because I think a lot of our focuses on residents in the city and not particularly on tourists. Ok, next question… **Q. We're finish…I told you it was about 20/30 minutes…** Good timing…30 minutes **Q. Thank you** You're welcome	• Lack of greater exchange of data across Manchester • Lack of insights about tourists' motivations in visiting Manchester • Greater, new understanding of the tourist market • Data can inform strategies • Better focus on residents

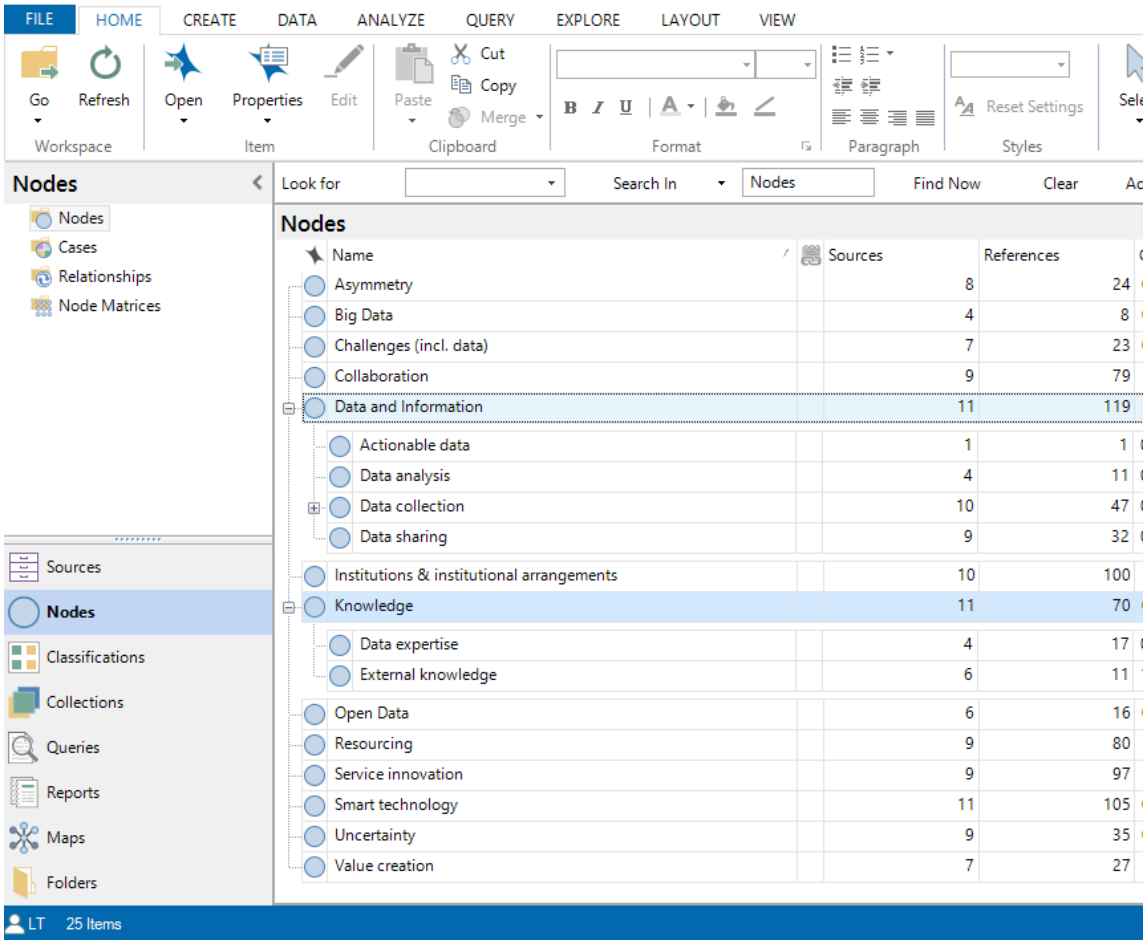
Appendix 14. Initial coding manual - codebook

Code name	Code description	Inclusion criteria	Exclusion criteria	Examples	Cumulated sources	References (citations)
Addressing barriers and limitations	Referring to the different ways of facing and dealing with the barriers and limitations affecting the value creation process and its components (e.g. the use of knowledge and skills or collaboration to face the lack of data)	Codes referring to activities and behaviours adopted to overcome the lack of key value creation resources (data, knowledge, and ICTs). This might also refer to both managerial and entrepreneurial behavioural approaches to face any challenge and issue concerning the process and resources for value creation.	All activities and behaviours not related to the overcoming the challenges and issues hindering the value creation process, its components, or resources.	*rely on existing relationships or existing knowledge and data to do that. Yeah, I don't think we're the place where we can be entrepreneurial. I don't think we…well we do it historically (K3)*	48	121
Barriers and limiting factors	Referring to all challenges and issues (practices, activities, and resources) preventing the creation of value, its components, and the application of related resources (e.g. the lack of data, information and skills)	Codes presenting a limitation, restriction or obstacle to the value creation process and the integration of key resources, thereof. In addition to resources in themselves, this coding might also include behaviours, practices and activities recognised as limitations or barriers and hindering factors.	Codes are excluded when showing factors that help and support the creation of value as well as the access or integration of resources. Contextual factors hampering the use of key resources and hindering the value creation process are also excluded	*In Manchester, for instance, there's a massive gap in terms of analytics skills. There's a massive gap in terms of understanding.* (D3)	87	280
Contextual factors	Referring to all tangible and intangible factors positively or negatively affecting the value creation process as well as the access and use of its key resources. Such factors are situational and solely referred to the Oxford Road Corridor context.	Codes discussing or mentioning rules, norms, beliefs, habits, attitudes, routines, laws, smart city policies and decision-making influencing value creation and the key related resources within the Corridor. Both enabling and hindering factors are included, either in an individual or aggregated form.	Statements and views of factors are excluded if not context specific. Codes without direct or indirect reference or a link to the Corridor ecosystem settings (physical or digital) are also excluded. This helps distinguishing the coding associated with the above barriers, limitations, and the ways to address them, when it comes to the hindering factors.	*I don't know if that's a Mancunian thing or it's just a general thing. But I think any of those conversations will have that same sort of vibe. I think that's where the seeds get planted to try stuff and work together and you get used to work together, so you trust each other.* (D4)	72	332

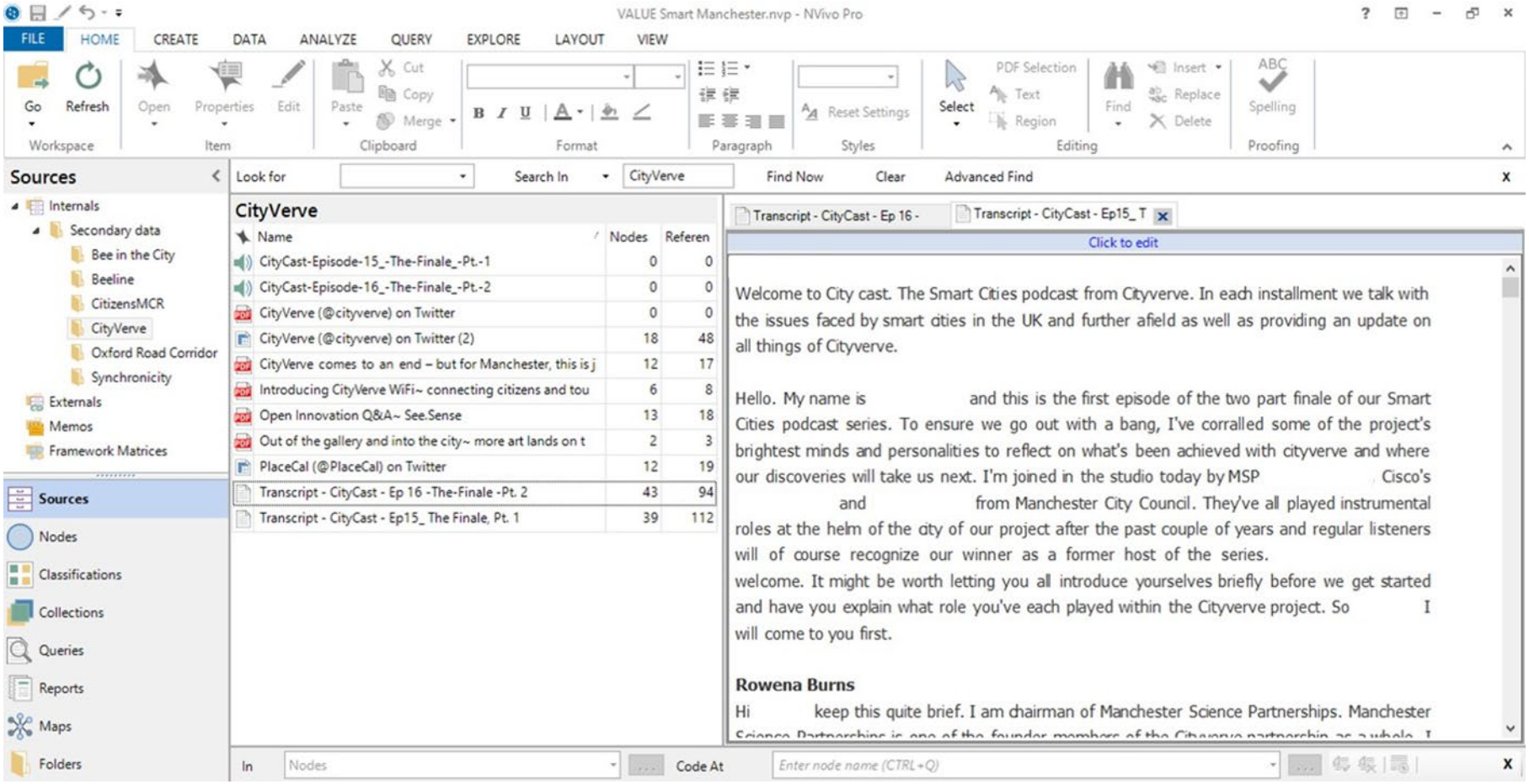
Initial Coding Manual – codebook (continued)

Code name	Code description	Inclusion criteria	Exclusion criteria	Examples	Cumulated sources	References (citations)
Service orientation	Referring to the use, integration, provisioning and enhancement of services and any related strategic view (e.g. city marketing and promotion at destination level).	Codes are included when discussing or mentioning service-oriented practices and activities supported by the use/integration of data, technology, knowledge, and skills. Codes referring to the creation of value through, or related to, services are also included in terms of value orientation.	The exclusion concerns all views and mentioning of service orientation practices and activities specifically associated with the context, hampering factors and the ways of overcoming them. Codes referring to value creation enabling factors and practices are excluded from the views linking value to service.	*Whether or not the app is the interface but at least to have some sort of integration and coordination system that both provides rich data for planning and provides useful information to citizens and tourists.* (K4)	39	165
Value creation enablers	Referring to all factors (activities, practices, and attitudes) enabling and sustaining value creation and its components.	Codes indicating inter-organisational factors facilitating interactions as well as access and integration of resources for value creation (e.g. collaboration, data, and knowledge sharing). Also, inclusion of empowering, engaging and networking activities/endeavours related to value creation and key resources.	Enabling factors discussed in direct or indirect relation to the context (contextual factors) are excluded. Exclusion of factors not supporting and allowing the value creation process and related practices.	*It's our job to provide data, provide reporting that helps other organizations to do their job essentially and to make decisions* (D4)	89	387
Value creation practices	Referring to all value creation practices associated with the data, information knowledge and ICTs resources, including the engagement and involvement of users.	Codes embodying the use and application of all components of value creation. Data collection and analysis when referring to data and information resources. Different forms of knowledge (collaborative, absorptive and adaptive) also linked to data management (collection and analysis) and technical skills. User's perspective related to value creation practices and their components.	Exclusion of practices clearly tied to data and knowledge sharing (identified as enabling factors). Data, information, technology, and knowledge-based situated practices, strongly linked to the Corridor settings (Contextual factors), are also excluded.	*APIs are just a mechanism for low friction sharing of capabilities and then the other worlds build on… that's only because the API have cut the friction out of the rest of it.* (K1)	182	690

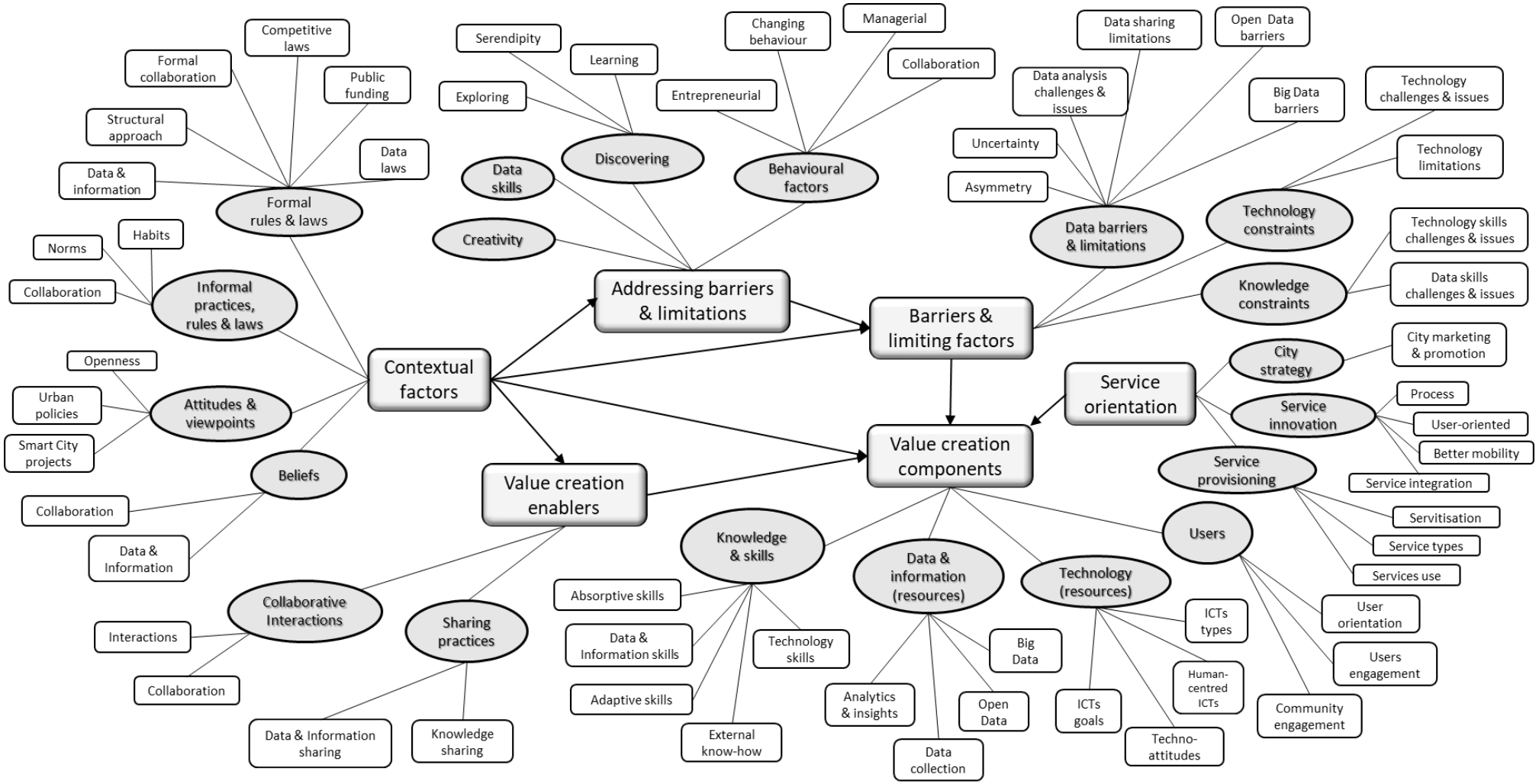
Appendix 15. NVivo primary data: initial coding (excerpt)



Appendix 16. NVivo secondary data analysis



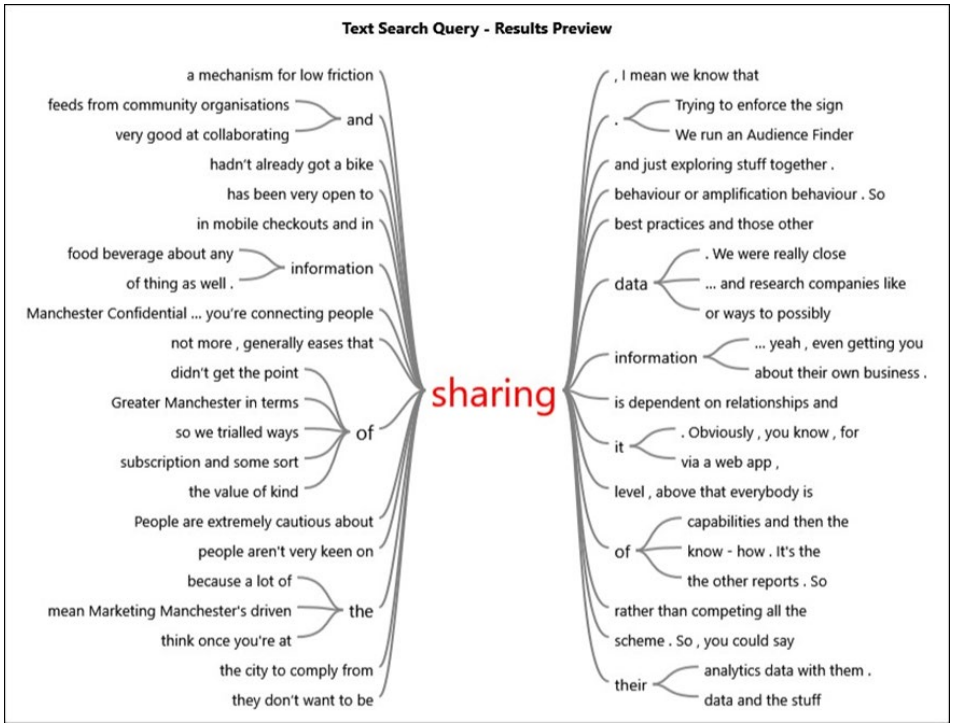
Appendix 17. Primary data analysis: thematic network map

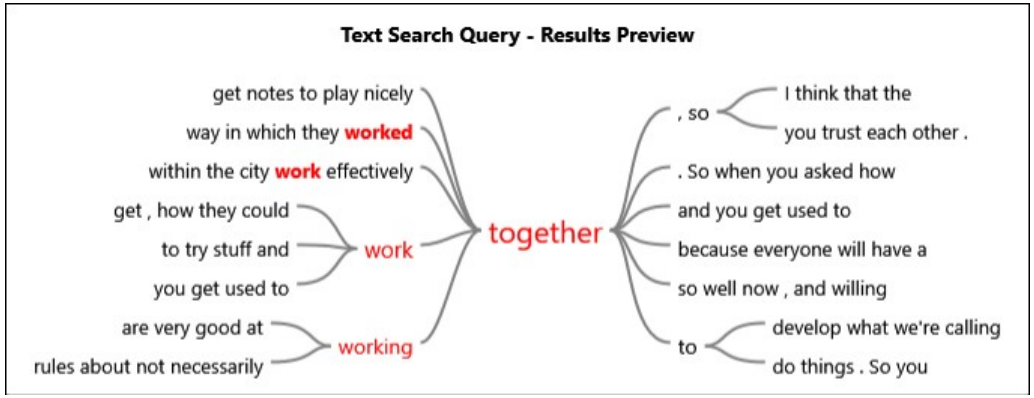


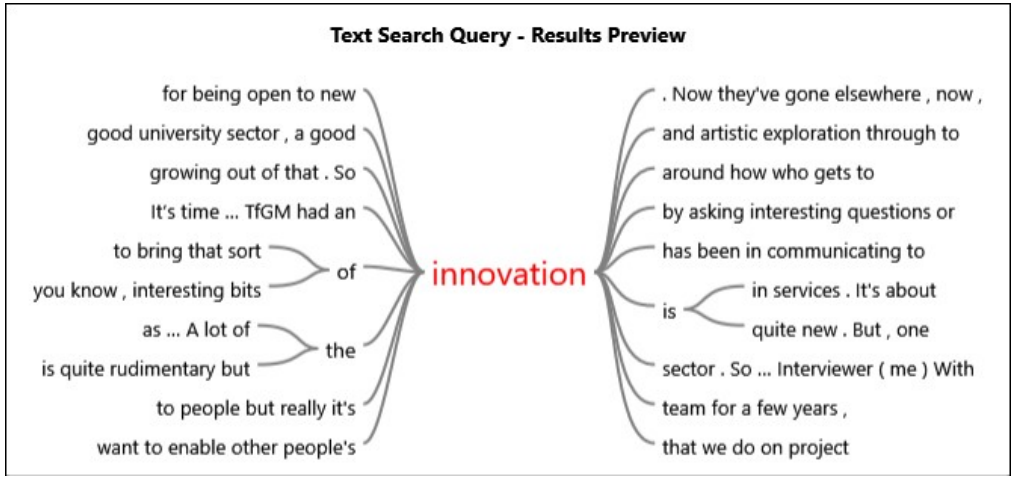
Appendix 18. Secondary data analysis: initial coding categories

Categories	Description	Cumulated Sources	References (citations)
Addressing barriers and limitations	Referring to the different ways of facing and dealing with the value creation barriers and limitations (e.g. open innovation, flexible behaviour, and holistic approach)	2	9
Bee in the City (Event)	Referring to the art trail event initiative (Bee in the City), with regard to implications for value creation (e.g. discovering, collaboration and partnership and people engagement)	9	76
CityVerve	Referring to the smart city project (CityVerve), with respect to the factors and components of value creation (e.g. sharing practices, collaboration, and governance)	43	135
Collaboration and partnership	Referring to collaboration and partnership enabling the value creation process within different contexts, for instance education, smart city projects and arts/culture	10	23
Collaborative interactions	Referring to collaborative interactions in terms of interactive activities triggering collaboration	5	13
Contextual factors	Referring to all physical and intangible factors positively or negatively affecting the value creation process the access and use of its key resources within the Corridor (e.g. servicescape, beliefs, behaviour, culture and creativity)	19	26
Engaging	Referring to all activities based on people engagement (e.g. learning and sharing)	7	14
Interactions	Referring to any activity based on interaction with users (e.g. customers) and within a relevant or specific sector (e.g. arts and culture)	9	11
Knowledge and skills	Referring to one of the key components of the value creation process. The code includes the learning, skills enhancements and all related limitations	12	25
Knowledge sharing	Referring to the exchange of knowledge and skills across sectors (e.g. higher education, arts and culture) and city projects (e.g. Beelines)	5	11
Oxford Road Corridor	Referring to the Corridor environment, with respect to stakeholders and any physical or intangible factor (e.g. innovation, collaboration, interactions, servicescape and sharing)	16	76
Smart city projects	Referring to all factors related to smart city projects/initiatives and the value creation process within the Corridor (e.g. data-driven solutions, innovation and sharing)	7	16
Smart City	Referring to the smart city concept and its key elements, including the components and enablers of value creation (e.g. data sharing, collaboration and social innovation)	10	34
Sharing	Referring to all sharing practice and activities supporting the value creation process (e.g. knowledge sharing, sharing stories about people of Manchester and local events)	13	20
Technology	Referring to technology as one of the components of the value creation process. The code includes challenges, issues and limitations as well as technical skills.	14	32
Users engagement/ involvement	Referring to initiatives, activities and practices related to the involvement and engagement of users/people as part of the value creation process (e.g. local community engagement in co-creation activities)	20	48
Service/social innovation	Referring to use cases and related service/social innovation involving residents and visitors	11	29

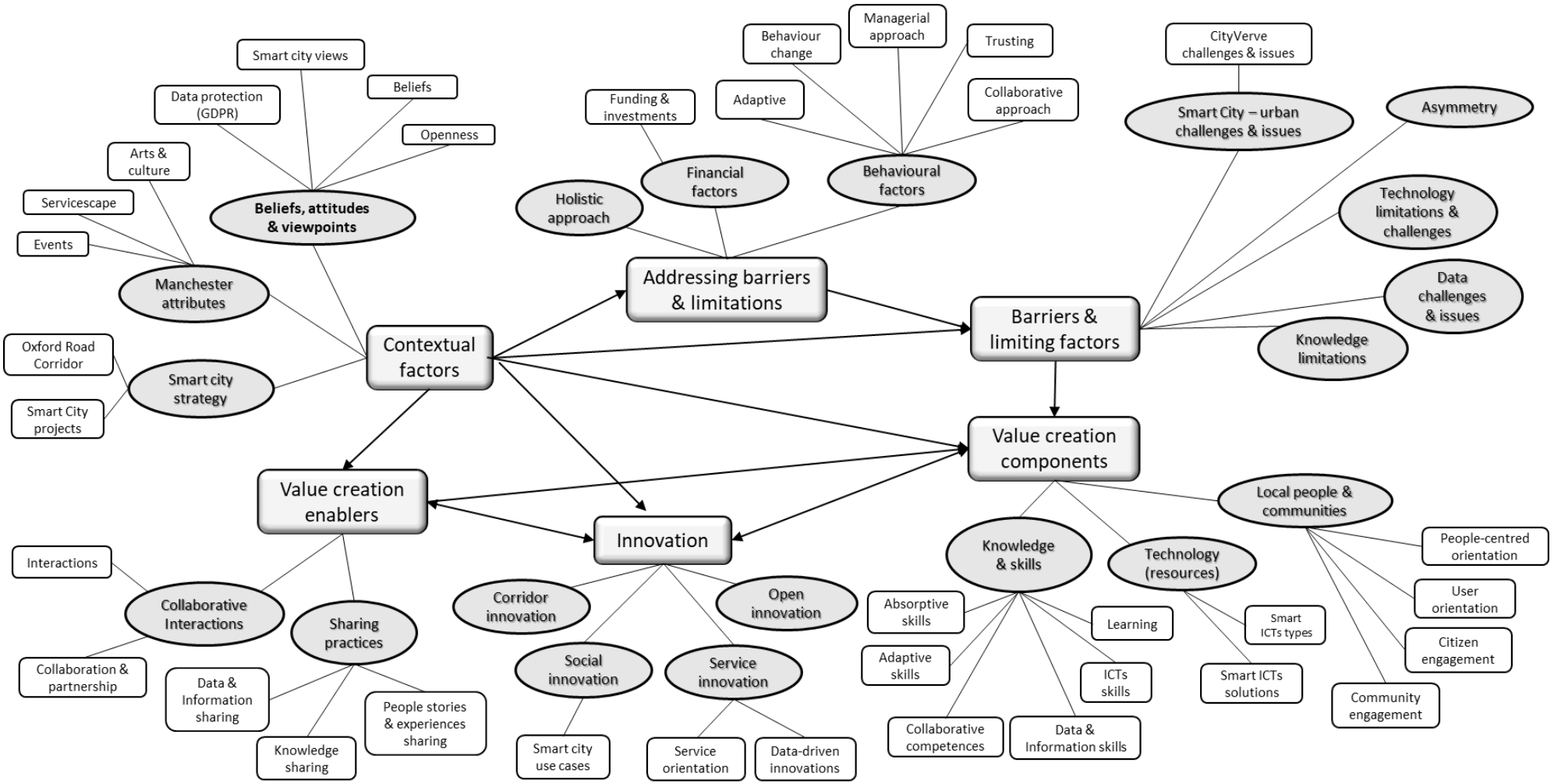
Appendix 19. Secondary data analysis: NVivo text query examples







Appendix 20. Secondary data Analysis: thematic network map



Appendix 21. Ethics checklist form

ETHICS CHECKLIST

Manchester Metropolitan University

This checklist must be completed **before** commencement of **any** research project. This includes projects undertaken by **staff and by students as part of a UG, PGT or PGR programme**. Please attach a Risk Assessment.

Please also refer to the University's Academic Ethics Procedures; Standard Operating Procedures and the University's Guidelines on Good Research Practice

Full name and title of applicant:	Lino Trinchini - PhD Student
University Telephone Number:	+44 (0)161 247 2000
University Email address:	
Status: All staff and students involved in research are strongly encouraged to complete the Research Integrity Training which is available via the Staff and Research Student Moodle areas	Undergraduate Student ☐ Postgraduate Student: Taught ☐ Postgraduate Student: Research ☑ Staff ☐
Department/School/Other Unit:	Faculty of Business and Law/School of Tourism
Programme of study (if applicable):	
Name of DoS/Supervisor/Line manager:	Thanasis Spyridiasis
Project Title:	An Analysis of Value Creation in Smart Tourism Destinations
Start & End date (cannot be retrospective):	September 2016 - September 2019
Number of participants (if applicable):	
Funding Source:	Manchester Metropolitan University

Brief description of research project activities (300 words max):

In order to select the relevant participant to the study, a desk research will be carried out to collect online public information about organizations (e.g. industry, type of business) within the selected tourism destination.
Interviews with managers within the selected organizations will be carried out using face-to-face interviews and semi-structured questionnaires. Two rounds of interviews will be considered to assess the value creation process. If agreed, face-to-face interviews will be recorded.

	YES	NO
Does the project involve NHS patients or resources? If 'yes' please note that your project may need NHS National Research Ethics Service (NRES) approval. Be aware that research carried out in a NHS trust also requires governance approval. Click here to find out if your research requires NRES approval Click here to visit the National Research Ethics Service website To find out more about Governance Approval in the NHS click here	☐	☑
Does the project require NRES approval?	☐	☑
If yes, has approval been granted by NRES? Attach copy of letter of approval. Approval cannot be granted without a copy of the letter.	☐	☐

NB Question 2 should only be answered if you have answered YES to Question 1. All other questions are mandatory.	YES	NO
1. Are you are gathering data from people?	☑	☐
For information on why you need informed consent from your participants please click here		
2. If you are gathering data from people, have you:	☐	☐
a. attached a participant information sheet explaining your approach to their involvement in your research and maintaining confidentiality of their data?	☑	☐
b. attached a consent form? (not required for questionnaires)	☑	☐
Click here to see an example of a participant information sheet and consent form		
3. Are you gathering data from secondary sources such as websites, archive material, and research datasets?	☑	☐
Click here to find out what ethical issues may exist with secondary data		
4. Have you read the guidance on data protection issues?	☑	☐
a. Have you considered and addressed data protection issues – relating to storing and disposing of data?	☑	☐
b. Is this in an auditable form? (can you trace use of the data from collection to disposal)	☑	☐
5. Have you read the guidance on appropriate research and consent procedures for participants who may be perceived to be vulnerable?	☐	☑
a. Does your study involve participants who are particularly vulnerable or unable to give informed consent (e.g. children, people with learning disabilities, your own students)?	☐	☑
6. Will the study require the co-operation of a gatekeeper for initial access to the groups or individuals to be recruited (e.g. students at school, members of self-help group, nursing home residents)?	☐	☑
Click for an example of a PIS and information about gatekeepers		
7. Will the study involve the use of participants' images or sensitive data (e.g. participants personal details stored electronically, image capture techniques)?	☐	☑
Click here for guidance on images and sensitive data		
8. Will the study involve discussion of sensitive topics (e.g. sexual activity, drug use)?	☐	☑
Click here for an advisory distress protocol		
9. Could the study induce psychological stress or anxiety in participants or those associated with the research, however unlikely you think that risk is?	☐	☑
Click here to read about how to deal with stress and anxiety caused by research procedures		
10. Will blood or tissue samples be obtained from participants?	☐	☑
Click here to read how the Human Tissue Act might affect your work		
11. Is your research governed by the Ionising Radiation (Medical Exposure) Regulations (IRMER) 2000?	☐	☑
Click here to learn more about IRMER		
12. Are drugs, placebos or other substances (e.g. food substances, vitamins) to be administered to the study participants or will the study involve invasive, intrusive or potentially harmful procedures of any kind?	☐	☑
Click here to read about how participants need to be warned of potential risks in this kind of research		
13. Is pain or more than mild discomfort likely to result from the study? Please attach the pain assessment tool you will be using.	☐	☑

Click here to read how participants need to be warned of pain or mild discomfort resulting from the study and what do about it.		
14. Will the study involve prolonged or repetitive testing or does it include a physical intervention?	☐	☑
Click here to discover what constitutes a physical intervention and here to read how any prolonged or repetitive testing needs to managed for participant wellbeing and safety		
15. Will participants to take part in the study without their knowledge and informed consent? If yes, please include a justification.	☐	☑
Click here to read about situations where research may be carried out without informed consent		
16. Will financial inducements (other than reasonable expenses and compensation for time) be offered to participants?	☐	☑
Click here to read guidance on payment for participants		
17. Is there an existing relationship between the researcher(s) and the participant(s) that needs to be considered? For instance, a lecturer researching his/her students, or a manager interviewing her/his staff?	☐	☑
Click here to read guidance on how existing power relationships need to be dealt with in research procedures		
18. Have you undertaken Risk Assessments for each of the procedures that you are undertaking?	☑	☐
19. Is any of the research activity taking place outside of the UK?	☐	☑
20. Does your research fit into any of the following security sensitive categories: • commissioned by the military • commissioned under an EU security call • involve the acquisition of security clearances • concerns terrorist or extreme groups If Yes, please complete a Security Sensitive Information Form	☐	☑

I understand that if granted, this approval will apply to the current project protocol and timeframe stated. If there are any changes I will be required to review the ethical consideration(s) and this will include completion of a 'Request for Amendment' form.

☑ have attached a Risk Assessment
☑ have attached an Insurance Checklist

If the applicant has answered **YES** to **ANY** of the questions **5a – 17** then they must complete the MMU Application for Ethical Approval.

Signature of Applicant: Lino Trinchini Digitally signed by Lino Trinchini DN: cn=Lino Trinchini, o=Manchester Metropolitan University, ou=Business and law, email=16025946@stu.mmu.ac.uk, c=GB Date: 2017.05.16 22:23:06 +01'00' Date: 21/11/2016 (DD/MM/YY)

Independent Approval for the above project is (please check the appropriate box):
Granted
☑ I confirm that there are no ethical issues requiring further consideration and the project can commence.

Not Granted
☐ I confirm that there are ethical issues requiring further consideration and will refer the project protocol to the Faculty Research Group Officer.

Signature: Ian Ashman Digitally signed by Ian Ashman Date: 2018.03.21 14:40:30 Z Date: 21/03/2018 (DD/MM/YY)

Print Name: Ian Ashman Position: Head FREG

Approver: Independent Scrutiniser for UG and PG Taught/ PGRs RD1 Scrutiniser/ Faculty Head of Ethics for staff.

Appendix 22. Analytical progress of value creation enablers theme

	Primary data	Secondary data	Primary data		Secondary data	
1st, 2nd, 3rd Level codes (Aggregated)	• Online interactions • Connecting • Exploring together • Partnering • Networking	• Interactions through smart technology (AR) • Academia-Museums-industry interactions • Oxford Road Corridor • Arts and Culture • Education • Smart city Projects • International collaborations	• Knowledge transfer • Shared learning • Skills provisioning • Online sharing (web and social media) • Tourism market information • People sharing data		• City Data sharing • Smart city ideas and learning/sharing • Smart city data project sharing • Sharing expertise • Sharing what learned • Training and technical workshops • AR/VR research • Educational sharing • People stories • Entrepreneurial stories • communities' experiences investing • Artists life stories • City innovation experiences	
Category	Interactions Collaborations	Interactions Collaborations and Partnerships	Data and Information sharing	Knowledge sharing	Sharing resources	Stories and Experiences
Sub-theme	**Collaborative interactions**		**Sharing practices**			

Category	Stakeholders interactions	Stakeholders collaborations	Networking	Data and Information sharing	Knowledge sharing and exchanges	Stories & Experiences
Sub-theme	**Collaborative interactions**			**Sharing practices**		
Theme	**Value creation enablers**					

Appendix 23. Analytical progress of sharing practices theme

	Primary data		Secondary data		
1st, 2nd Level codes (Aggregated)	• Shared learning • Knowledge transfer	User-centred data sharing	Sharing ideas, expertise and learning	Smart city projects	People and communities
Category	Knowledge	Data and Information	Knowledge	Data and Information	Stories and experiences

Category	Knowledge sharing	Data & Information exchanges	Stories & experiences
Sub-theme	**Sharing practices**		
Theme	Value creation enablers		

Appendix 24. Analytical progress of knowledge theme

	Primary data	Secondary data
1st, 2nd, 3rd Level codes (Aggregated)	• Absorbing data/information • Data collection, sharing and analytical skills • Refining, updating and repurposing services • Market knowledge • Smart technology know-how • Travel technology knowledge • Other digital skills	• Convert knowledge into use cases and best practices • Adaptive data-driven decision-making capabilities • Collective expertise for services and projects • Digital skills • Data integration, collection and analytical skills • Learning experiences • Individual and collective learning
Category	• Absorptive skills • Data and Information skills • Adaptive skills • External know-how • Technology skills	• Absorptive skills • Adaptive capabilities • Collaborative competences • Technology Skills • Data knowledge and skills • Learning
Sub-theme	**Knowledge** (capabilities and skills)	**Knowledge** (capabilities and skills)

Category	• Absorptive skills • Data and Information skills • Adaptive skills and capabilities • External know-how	• Technology skills • Collaborative competences • Learning
Sub-theme	**Knowledge** (capabilities and skills)	
Theme	Value creation components	

Appendix 25. Analytical progress of innovation theme

	Primary data	Secondary data
1st, 2nd, 3rd Level codes (Aggregated)	• Slow, parallel and iterative process • Customised and target services • Smart transport services • Multiple services and ICTs integration • Adapting to customers' needs • Location-based services use	• Community data-driven innovations • Local Travel and transport innovations • Smart services • Sustainable mobility
Category (Aggregated)	• City marketing and promotion • Process • User-oriented • Mobility experience • Service integration • Contextual innovation factors • Servitisation • Types of services • Service use	• Data-driven innovation • Open-minded and new ideas • Helping informed decision-making • Smart city project open innovation • Emergent new ideas/services • Service orientation • Smart city use cases (social)
Sub-Theme	• City strategy • Service enhancements • Service Innovation context • Service provisioning	• Oxford road Corridor innovation • Open innovation • Service innovation • Social innovation
Theme	**Service orientation**	**Innovation**

Category	• Process • User-oriented • Mobility experience • Service integration	• Local transport innovation • Oxford Road Corridor innovation • Smart city use cases (social)
Sub-theme	• Service enhancement • Data-drive innovation • Open innovation	• Innovation context • Social Innovation
Theme	**Innovation**	

Appendix 26. Analytical progress of asymmetry and uncertainty theme

	Primary data		Secondary data
1st Level codes (Aggregated)	• Organisations competing objectives (public/private on data management) • Data use indecision (over lack of data)	• Different data format and tracking • Data availability and access gap • Heterogeneous technology platforms • Dispersed core skills • Different testing abilities • Skills-salary gap • Divergent strategic vision • "London effect" • 3rd party resources gap • Rich vs poor	
Category	• Data uncertainty • Changing politics • Use of sensor and tracking • Ever-changing users' needs (technology)	• Data asymmetry • Technology asymmetry • Knowledge and skills asymmetry • Market/Society/Services asymmetry	• People knowledge vs service planning • Different cultures • Different expectations • Small vs big businesses
Sub-Theme	**Uncertainty**	**Asymmetry**	**Asymmetry**

Category	• Data uncertainty • Changing politics • Use of sensors and tracking • Everchanging users' needs	• Data asymmetry • Technology asymmetry • Knowledge and skills asymmetry • Market/Society/Services asymmetry
Sub-theme	**Uncertainty**	**Asymmetry**
Theme	**Value creation constraints**	

Appendix 27. Analytical progress of value creation constraints theme

	Primary data						Secondary data				
1st, 2nd, 3rd Level codes (Aggregated)	• Lack of data (analytical) skills • Limited technology skills	• Lack of technology skills • Interoperability issues • Implementing solutions	• Closed data systems • Overlooking processing limitations • Lack of data resources	• Public-private competing objectives • Indecision over existing data	• Different data sources and access • Different skills • Different strategic vision	• Long-term benefits • Overtourism • Poor leadership				• Collaboration challenges • Contracts (T&C)	
Category	• Data skills challenges & issues • Technology limitations	• Technology limitations • Technology challenges & issues	• Big data barriers • Open data barriers • Data analysis • Data sharing limitations	• Data uncertainty • Everchanging needs and wants	• Data asymmetry • Technology asymmetry • Knowledge asymmetry • Market, Society and services asymmetry	• Smart city • Service innovation	• Limited knowledge of data value • Limited knowledge of infrastructure	Data privacy (GDPR)	• Public Wi-Fi use • Regulations vs requirements • IoT complexity	• CityVerve challenges and issues	• Cultural differences • Small vs Big businesses • Different expectations
Sub-Theme	**Knowledge constraints**	**Technology constraints**	**Data barriers and limitations**	**Uncertainty**	**Asymmetry**	**Other challenges and issues**	**Knowledge limitations**	**Data challenges and issues**	**Technology limitations and challenges**	**Smart city challenges and issues**	**Asymmetry**

Category	• Data skills constraints • Technology skills limitations and challenges	• Technology limitations • Technology challenges and issues	• Big data and open data barriers • Analytical issues • Data sharing limitations • Data challenges & issues	Data uncertainty	• Data asymmetry • Technology Asymmetry • Knowledge asymmetry • Market, Society and services asymmetry	• Smart city challenges • Service innovation issues
Sub-theme	**Knowledge constraints**	**Technology constraints**	**Data barriers and limitations**	**Uncertainty**	**Asymmetry**	**Other challenges and issues**
Theme	**Value creation constraints**					

Appendix 28. Analytical progress of addressing constraints theme

	Primary Data				Secondary Data		
1st, 2nd, 3rd Level codes (Aggregated)	• Change approach to data • Experimenting • Doing different and testing with users • Predictive approach • Personal interactions • Willingness to explore ideas and solutions	• City discovering • Exploring with people • Unplanned new solutions • Discovering with data • Learning the city • Willingness to learn from places		• Helping with data • Integrating set of skills • Data skilled people • Online engagement understanding • Data literacy		• Regulation and data use alignment • Behaviour change vs infrastructure focus • Trusted advisory role • Trust in smart ICTs • Project planning • Clear objectives and goals • Government -industry collaboration	• Charity funding • Business approach • Co-funding • Culture and communities' investments
Category	• Changing behaviour • Entrepreneurial approach • Managerial approach • Collaboration and interactions	• Serendipity • Learning • Exploring	• Creative thinking stimuli • Artistic approach to technology • Artistic responses • Creative engagement	• Data managers role • External knowledge • Knowledge for data constraints	• Overall directions and focus • Global and local thinking	• Adaptive abilities • Behaviour change • Trusting • Managerial approach • Collaborative approach	• Funding and investments • Revenue sharing models • Financial viability
Sub-Theme	**Behavioural factors**	**Discovering**	**Creativity**	**Data skills**	**Holistic approach**	**Behavioural factors**	**Financial factors**

Category	• Changing behaviour on data • Adaptive abilities • Entrepreneurial approach • Managerial approach • Collaboration and interactions • Trusting	• Serendipity • Learning • Exploring • Creativity	• Data managers role • External knowledge on data and ICTs • Data challenges skills • Knowledge for data constraints	• Overall directions and focus • Global & local thinking	• Funding and investments • Revenue sharing models • Financial viability
Sub-theme	**Behavioural factors**	**Discovering**	**Data skills**	**Holistic approach**	**Financial factors**
Theme	**Contextual factors**				

Appendix 29. Researcher's publications

Journal Articles

Trinchini, L., Kolodii N.A., Goncharova, N.A. and Baggio, R. (2019) 'Creativity, Innovation and Smartness in Destination Branding', *International Journal of Tourism Cities*, 5 (4) (2019), pp. 529-543,

Conference Proceedings

Trinchini, L. and Spyriadis, T. (2019). Towards Smart Creative Tourism. In *Smart Tourism as a Driver for Culture and Sustainability* (pp. 451-465). Springer, Cham.